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THE BRITISH AND EASTERN CONTINENTS
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FRIDAY, OCTOBER 26, 1906.

The reported action of the Harriman lines in refusing to grant through rates to points west on shipments of freight received from the Denver & Rio Grande at Ogden will probably have an effect in hurrying along the construction of the Western Pacific, the Gould outlet to the Pacific coast. Construction work has been hampered by scarcity of labor and has not made as much progress as was anticipated. About 74 miles of track have been laid west of Salt Lake City and some has been laid outside of Stockton, Cal. No work has yet been done in Nevada but the first contract for 106 miles has been awarded. This section begins at the Great Mud Desert and extends northwest along the sand hills of the Great Salt Lake basin to Silver Zone Pass in the Toano range, where an elevation of 5,860 ft. is reached, the highest point on the road. From the summit the line runs southwest into the Gosiute valley. From the crossing of the Nevada Northern in this valley, the Western Pacific ascends nearly to the summit of the Pequop range, which will be pierced with a 6,000-ft. tunnel at Flower Lake Pass. The line then follows the Humboldt river, west for 18 miles, to Deeth, on the Southern Pacific. About 200 miles of the remaining 230 miles in Nevada have been surveyed through the Southern Pacific land grant. The Spring Garden tunnel in California is in 1,403 ft. at the west end and 529 ft. at the east end, and the Beckwith tunnel is in 418 ft. at the east end. Large deliveries of ties are being made from Oregon for use in California and Utah. The completion of the 937 miles of road from San Francisco to Salt Lake City by the summer of 1908 will hardly be possible unless weather conditions are exceptionally favorable and big inducements are given to laborers, who are flocking to San Francisco where wages are more than double the prevailing rates elsewhere.

The New York Central & Hudson River Railroad Company and one of its traffic officers has been heavily fined for granting rebates to the American Sugar Refining Company with the result that during the year 1904 a net charge of 18 cents per hundred pounds from New York to Detroit was granted, instead of the regular tariff of 23 cents. The judgment is a just one. In imposing the fine Mr. Justice Holt described the case accurately as follows:

"Such a violation of the law, in its essential nature, is a very much more heinous act than the ordinary common, vulgar crimes which come before criminal courts constantly for punishment which arise from sudden passion or temptation. The crime in this case was committed by men of education and of large business experience and whose standing in the community was such that they might have been expected to set an example of obedience to law, upon

the maintenance of which alone in this country the security of their property depends."

Aside from the law, the moral responsibility may well be considered. The indictment of the New York Central was made under the provisions of the Elkins Law of 1903, and its violation occurred during the year 1904. Every railroad officer knows that the mere enactment of the Elkins Law had no effect *per se* on the transactions of the traffic officers of most of the more than one thousand operating railroads in this country. Any one railroad competing for business and relying upon the enforcement of this law would immediately have lost money for its stockholders, and yet every decent railroad officer was anxious that that law should be enforced, knowing that it would be profitable to his company if the law could be enforced. Ever since 1887 the railroad companies have been trying to make and maintain agreements among themselves by means of which the iniquitous rebate system could be killed. It is probable that they could have succeeded in this if they had not been prevented by law from making and enforcing pooling agreements. The question, therefore, before the New York Central traffic officers, and most other railroads in this country in 1904, was: Shall we immediately obey a law which the government gives no indication of enforcing and which we know our competitors will not obey until the government so enforces it? We are forbidden to maintain rates by agreement among ourselves. We are forbidden to cut rates in order to meet our competitors. They decided, as other companies in like cases generally decided, to protect their stockholders as well as they could and disobey a law that was not enforced. Few men in active life will consider that an ethical question is involved in their decision at that time. In paying the penalty justly imposed upon them, they are paying for a lesson both to themselves and to all other railroad companies. The primary fault lies rather with the then Interstate Commerce Commission and with the Attorney General's office; for, inasmuch as the companies were forbidden to enforce rate maintenance by pooling, they felt bound to pursue the old methods until those entrusted with the enforcement of the law showed some indication of a willingness to enforce it and at the same time protect those who were anxious to obey it.

Among the many committees of dissatisfied security holders which have been formed there is one representing the owners of a majority of the \$7,000,000 debenture B income bonds of the Green Bay & Western Railroad, a 214-mile road which runs from Green

Bay, Wis., on Lake Michigan, west to the Mississippi river at Winona. The road was reorganized in 1896 under an arrangement by which these bonds are entitled to all the surplus earnings of each year after 5 per cent. each has been paid on \$600,000 debenture A bonds and \$2,500,000 capital stock. Nothing has ever been paid on the B bonds. Like the committee of Wabash debenture B bondholders, this committee was formed in the belief that surplus earnings which should be applied to payments on these securities were being spent on the improvement of the road. The plan worked out by the committee, however, is quite different from the Wabash plan which was approved this week. In brief, it is to have the committee buy the capital stock, take over the road, reorganize the company and extend the line. The committee has an option on a majority of the stock and has issued a circular calling on the "B" bondholders to subscribe \$400 for every \$1,000 held to provide funds for its purchase. The purchase price of the stock still has to be settled by negotiation. First mortgage 4½ per cent. bonds of the new company, limited to the rate of \$25,000 a mile, are to be issued at 90 per cent. of their face value to subscribers in return for their subscriptions, and enough of these bonds are to be set aside to provide for taking up the outstanding "A" debentures. The road is to be reorganized under the name Green Bay & St. Paul and the 120-mile extension northwest along the Mississippi necessary to bring it to St. Paul is to be built. This will give it in all some 400 miles of line and increased opportunity for through traffic. The Green Bay & Western over a controlled line exchanges traffic for the East at Kewaunee by car ferry with the Detroit, Toledo & Ironton-Ann Arbor system, and although the proposed through line would compete with the North-Western Line, the Chicago, Milwaukee & St. Paul and the Wisconsin Central for traffic from Lake Michigan ports to the Twin Cities, it would undoubtedly be able to secure some share of this—enough, probably, to make the reorganization plan profitable. The plan to take over the road and extend it is interesting both as bearing on the local traffic situation and as an example of a rather unusual means of protecting the interests of holders of a junior and debenture bond issue.

LIBELING THE PENNSYLVANIA.

The evidence concerning the rear end collision at Eddington, on the New York division of the Pennsylvania Railroad on September 29, all of which we have had a chance to examine, shows quite positively that the failure to stop the six-car train, No. 107, which hit a stalled train was due to the accidental closing of an angle-cock between the third and fourth car. Air-brakes rarely fail to work, but they occasionally fail to be properly worked. The accidental closing of the angle-cock, shutting off brake power in the cars behind, is unusual; nevertheless it has several precedents, and some of the ascertained causes were discussed in this column last week. In this case the engine brakes and the brakes throughout the train were found to be in order, but the closing of the angle-cock put out of service the brakes on the three rear cars and their stored energy pushed the rest of the train along to the collision point.

The angle-cock handle was in the correct position when the train started from Jersey City, and at some point between there and Croydon the handle was pulled or knocked around to the wrong position. Inasmuch as this handle is on top of the angle-cock and is in the form of a curve parallel to the air-brake hose and about 1 in. from it, there is, of course, the minute chance that a stone thrown by some one may have hit it and turned it around. There is more chance that a piece of rock ballast may have been thrown up from the wheel flanges and hit it. There is also another equally probable cause; namely, that a three-link safety chain, not coupled up, was hanging from the car within reach of this turned handle. Of course, it is difficult to imagine what sort of pendulum motion, or whip-cracking caused by a lurching of the train, may have lifted one of these links so as to catch the end of the valve handle and knock it about, but the fact that this could have happened leads one to consider the dangling safety chain as a possible cause of the accident. Those who have happened to observe, as has the writer, the occasional freakish and violent action of a few yards of bell cord flying loose from the rear car at high speed will not be inclined to deny the possibility of this diversion of the safety chain from its intended function. The angle-cock handle did not have the locking device, which we have heretofore described. This device in a form that is practically available is new for passenger car service, nevertheless the Pennsylvania Railroad had ordered and has been equipping its passenger cars with it.

In two other respects the Pennsylvania officers have been improperly criticised, and they probably feel the injustice keenly, as other officers do under like circumstances. Reference to it seems proper here rather for the information of the public and editors than as containing anything new to the railroad man. It has been said by many, and by some who should know better, that the Pennsylvania's requirements of its enginemen are such that they run recklessly past distant signals. It is also said that their enginemen are overworked. In this case Engineman Van Arsdale, of train 107, has been an engineman on the Pennsylvania road for 40 years and has been running passenger trains on the New York division for the past 20 years. His present daily trick is a two hours' run from Jersey City to Philadelphia, a three hours' wait in Philadelphia and a two hours' return to Jersey City; seven hours a day on duty; four hours a day in driving. Before this accident he had had the usual full night's sleep at home, and it is a matter of fact that he is a thoroughly trained man, physically and mentally well equipped for his duty. His experience in attempting to stop his train, fully corroborated by his fireman, is given in his own words as follows:

"When I saw the green, or distant, signal, at Croydon my train was running about 65 miles an hour. I shut the throttle off as soon as I saw the warning signal and applied the air. The air did not take hold like it ought. I could not feel it at all on the first application, and then I used the emergency, as I saw the red or stop signal. This did not work, and for probably 700 or 800 yards I used sand on the track."

The Croydon distant signal stands 3,480 ft. from the home signal, and the standing train with which No. 107 collided was 1,170 ft. beyond the home signal. The grade was nearly level. Van Arsdale saw the distant signal, shut off his steam and began to apply brakes when he was considerably more than 4,600 ft. from the rear end of the standing train. If the brakes had been operative on the three rear cars, considering the fact that the brakes were, after the accident, found to be in good order, he could have easily brought his train to a full stop within 1,500 to 1,800 ft. from the point where he moved his handle. He was therefore doing his whole duty and was properly cautious in feeling for his brakes at the distant signal. Under ordinary conditions he would have been perfectly safe in keeping up his 65-mile-an-hour gait for a quarter of a mile farther, for he knew his lengths from distant to home and knew his grades and curves; but he was cautious, wanted to be sure the brakes were working, so he began early. His good record of 20 years' passenger running on this division is a sufficient warrant for this assumption.

The other cruel criticism, to the effect that the Pennsylvania insists upon its enginemen making time, and to this end running recklessly, is especially wicked. In addition to ordinary inspection and watchfulness the road uses the method of surprise checking, and has been doing it with increasing thoroughness during recent years. The engineman who overruns his red, or home signal at danger, is promptly punished. Surprise checking is watching the signals unknown to the engineman, and a list showing surprise tests of 1,071 trains, 1,000 enginemen are recorded as exactly complying with the rule; that is, not to allow the point of the pilot to pass the danger signal. Seventy-one disobeyed the strict letter of the rule, but did not pass to any dangerous position. Not a single one of these 1,071 secretly observed cases involved any danger whatever; nevertheless, the few who made a technical error were promptly disciplined, usually by suspension.

AN AMERICAN RAILROAD SIGNAL SYSTEM.

"A complete system of signaling for the proper handling of traffic" is the title of the most important subject presented at the Railway Signal Association in Washington last week, which is reported on another page. The committee making the report, on which are some of the strongest men in the association, has well complied with the terms of the title. Not only that; it has broken away from tradition, and the system devised is original as well as complete. In important features it is so different from present universal practice that it will not for a long time be generally accepted, both because of conservatism and the cost and inconvenience of changing fixtures. This, probably, is its greatest fault; the transition period, with its violations of uniformity, constantly tempting inventive minds to introduce something different, will be long drawn out. But the new scheme probably will not succeed at all unless it is acceptable to the Pennsylvania Lines both east and west; and it seems quite possible, perhaps probable, that the New York Central Lines will act with the Pennsylvania; so that if the

change is made, over 20,000 miles of road may be favorable at the start, including the lines of heaviest traffic in the country.

This comprehensive signaling scheme follows closely the recommendations of Messrs. A. H. Rudd and Frank Rhea in the "Rudd, Rhea and Revolution" report which has been kept so carefully locked up during the past year; and it has been thoroughly discussed by prominent officers of the Pennsylvania. It has also been much discussed on the New York Central and some other roads; and the fact that the conservatism of these men has not killed it is good evidence of its merit.

The new plan is revolutionary in only two of its features: the upward inclination of the semaphore arm, and the abolition of distant signals. The upward inclination is adopted simply to get rid of the counterweight and of the clumsy arrangements necessary, with the downward inclination, to insure return of the arm to the stop position in case of failure or breakage, or overloading by snow, when the arm is in the "proceed" position. The abolition of distant signals does away with a venerable inconsistency, now made tolerable in one way in England and in another way in America, but it does not do away with the distant indication. Instead, it makes an important increase in its usefulness. The committee simply returns to the pure semaphore principle of having a different position of the arm for each different indication. Unfortunately no better word than "caution" was found for the adverse distant indication. If we must forever use this word it is important to limit its meaning, arbitrarily, as narrowly as possible. To say "proceed cautiously," as the committee prescribes for five essentially distant indications, leaves too much to be decided by the runner as to what "cautiously" means. What these indications really say to the engineman is "Proceed, expecting to find the next signal against you," and the rule may as well say so. It should make very clear the fact that the signal does not require him to be cautious about anything else except the necessity of obeying the next signal.

The committee appears also to have lapsed from the strict requirements of its theory in using the term "home" signal. "Distant" signals are abolished, every signal being capable of giving a distant indication; and "home" becomes equally useless. No signal can be properly called "home," in the sense of a signal which means stop, because each one gives both the stop and the caution indication. There seems at first glance to be another inconsistency under the new plan. If the runner has green and vertical, indicating a clear road for two blocks, why cannot the upper arm remain horizontal? Obviously, because he has not yet reached the diverging track and can proceed only on authority from the upper arm. There will be criticism because there is no provision here for equally high speed on both the straight line and the diverging line, as is desirable at some junctions; but the advantage of consistency is great and it will be well worth while to make the tracks and the practice at all junctions conform to the arrangement shown in the diagram, rather than try to modify signals to suit "local conditions."

As to the four main features of the new scheme—the universal two-light arrangement, the use of green for clear and yellow for caution, the upward inclination and the three-position principle for daylight, the action of the association on the last three was intelligent and decided. The votes, it is to be remembered, were those of the senior active members only; all of them railroad officers and probably all of them men who have had time to consider the question many months. But only a few of them are operating officers; and the views of superintendents, trainmasters and men who control appropriations are yet to be heard. How soon we shall have this additional expression of opinion remains to be seen. The Maintenance-of-Way Association will discuss the subject, but there are few operating men in that association. The subject has hardly been digested sufficiently to be taken before the American Railway Association. As operating officers have no national association in which a question like this can be satisfactorily dealt with, it is much to be desired that they attend more freely the meetings of the Signal Association. At this last meeting the signal men said a good many things that it would be profitable for most superintendents and trainmasters to hear, but the speakers were naturally restrained from saying everything that they wished on matters pertaining to another department. A dozen enterprising operating officers could have added greatly to the value of the meeting.

We have spoken of the committee's scheme as "complete." Some paragraphs will be rearranged and modified, in the light of the criticisms made at the meeting, and the definitions of the 24 indications may be found to need changing, by consolidation or

otherwise; but the term "complete" is not unwarranted, for every needed indication is provided for and every apparent or probable conflict of indications has been considered with care. Indeed, we are inclined to think that too much has been attempted, and that the arrangement which finally prevails will have fewer indications. As was well said by a prominent member at the meeting, if the signal engineer tries to tell the locomotive engineer everything that he needs to know, some superintendent will next propose a still further enlargement of the requirements. The signals will not only have to tell the engineman to take the next siding, but also what to do after he gets into it—"set out a couple of cars," perhaps; or wait thirty minutes for extra west. On the whole, however, in spite of minor objections, we believe this report to be a long step in advance in the development of American railroad signaling. The system which it proposes has been long and well considered. Adoption of its recommendations, though it will of necessity come slowly, would result in a simplicity and a uniformity which would greatly increase the efficiency of American signal practice.

THE ILLINOIS CENTRAL CONTROL.

President Stuyvesant Fish gained a temporary victory over the Harriman interests in the fight for control of the Illinois Central at the annual stockholders' meeting held last week in Chicago, but he widened the breach between the factions and has possibly placed himself in a precarious position for re-election as President of the road when the directors meet in November to elect officers. Mr. Harriman has had his eye on the Illinois Central for five or six years—ever since the Union Pacific leased the Southern Pacific. Two things were essential to his plans for the development of the western roads which he controls: to make his position on the gulf secure and to obtain an entrance into Chicago. The Kansas City Southern offered a means to one of these ends, and the Alton promised to achieve the other. The Kansas City Southern scheme failed because the stockholders of that road insisted on being heard from and the Rock Island obtained an equal share in control of the Alton. The Illinois Central, with its direct line from Chicago to the gulf and an entrance from Omaha, together with its magnificent credit, promised to fulfil both of the requirements of Mr. Harriman, and he began a quiet but determined effort to attach it and weld it into his vast system on the other side of the Mississippi river, the dividing line between the railroads of the East and the railroads of the West. But he did not bargain on the resistance of President Fish, who was not afraid to openly refuse to yield to the wishes of the man "who moves in a higher sphere into which we cannot enter." Mr. Fish is reported to have said eight months ago, when Mr. Harriman made an offer to buy out his holdings of Illinois Central stock: "I have been President of the Illinois Central for nearly twenty years, and I hope to be President for many years longer, but I never have been and never will be a Harriman president of the Illinois Central." In his characteristic way, Mr. Harriman set about to undermine the position of the guardian of the small stockholders' interests. Through Kuhn, Loeb & Company he began to solicit proxies to be voted at the annual meeting, and in June last Mr. Fish also began a canvass for proxies. At a meeting of the Board on July 18, Mr. Peabody, one of the Harriman directors, introduced a resolution that a committee of five directors be appointed to collect proxies. The five directors named in the resolution were all so-called Harriman men, and Mr. Fish, scenting danger, refused to agree to the proposition and left the meeting, breaking the quorum and preventing further action. A week later Mr. Fish met Mr. Harriman and Mr. Peabody and, as he claimed, was assured by them verbally that there was no intention of turning over control of the Illinois Central to any other corporation and that the successor to W. Morton Grinnell, who had died during the year, would be a man of character, representing all the stockholders, and a man personally satisfactory to Mr. Fish. On the strength of this verbal assurance Mr. Fish signed the following agreement:

1. Three out-going directors to be re-elected.
2. Mr. Grinnell's successor to be selected by a majority of the several directors acting.
3. Mr. Peabody's resolution of July 18 to be withdrawn and not to be revived this year.
4. The Harriman-Kuhn, Loeb proxies to be given to Mr. Fish.

This much was in writing. On October 10 a special meeting of the board of directors was called, and after the meeting the question of the successor to Mr. Grinnell was discussed. Mr. Fish's version of the meeting is as follows:

"I was surprised at being presented by Mr. Harriman with written com-

mitments, previously procured by him from certain directors, without notice to me and others, of the selection of Mr. Henry W. DeForest, a director of the Southern Pacific Company, which is a subsidiary corporation of the Union Pacific. This, in controvension and utter violation of the understanding and agreement, that an independent man not affiliated with Union Pacific interests should be brought into the board."

At the stockholders' meeting last week the name of Mr. DeForest was presented and he received the votes of 2,100 shares. Mr. Fish nominated James DeWitt Cutting of New York and, by virtue of the proxies in his hands, voted a total of 613,703 shares for his candidate, who also received some 16,000 votes of small stockholders. At the same time, instead of voting his overwhelmingly controlling proxies for his own personal supporters, he carried out the compromise agreement by voting for the re-election of the three outgoing directors—Messrs. Beach, Harahan and Cornelius Vanderbilt—who were re-elected without opposition. In voting these shares he said:

"The issue thus presented is whether I shall vote as proxy for the stockholders of the Illinois Central Company in favor of turning over their property, in effect, to the control of another company when such proxies have been entrusted to me with the full knowledge that I would oppose such action. I notified Mr. Harriman and his associates that I would not vote any of their proxies in opposition to their expressed wishes, but at the same time I would not become a party to their scheme, nor vote for it if the other proxies confided to me. As the tellers' report shows, I hold proxies entitling me to vote upwards of two-thirds of the entire capital stock of the company, but in this matter I am acting solely in the interests of the shares I represent or own."

As the board now stands, seven of the 13 directors—Messrs. Harriman, Peabody, Luttkin, Auchincloss, Golet, Vanderbilt and Harahan expressed themselves as opposed to the choice of Mr. Cutting. The other six directors, including Governor Deneen, ex-officio member of the board, side with Mr. Fish. If this division is maintained unbroken at the directors' meeting next month, and Mr. Harriman decides to force the issue, Mr. Fish can be retired as the head of one of the most conservative and well-managed railroads in the country; a road which is one of the few remaining landmarks in the West of the passing era of independent railroads operated for the benefit of the individual shareholders and not for the benefit of a favored few in control. Whether a change in the control of the road will benefit the future interests of the stockholders is beside the point in the present controversy. The fight, as it appears, can be summed up by saying that Mr. Fish, relying on a verbal agreement, was willing to sign an unqualified written agreement. Mr. Harriman ignored the context, and "there you are."

THE RAILROAD TERMINAL PROBLEM

About a third of a century has passed since what was then the "great" railroad station on Forty-second street, New York, was opened for joint occupancy of the New York Central, New York & Harlem and New York, New Haven & Hartford railroad companies. Succeeding the meager and crowded area of the earlier station on Twenty-seventh street the Grand Central Station of that day seemed big, and was big. Men not yet very far past middle life gazed at the empty spaces and the lofty arching spans, and were, free in their prophecies that they would never live to see the structure fully utilized. Yet the Grand Central Station has had to be enlarged twice, must be enlarged again and in "rush" hours before holidays, is on account of its space limitations, the target of anathema of waiting multitudes. It was not many years after the Grand Central was opened that the large station of the Boston & Providence was built in Boston. That, too, was deemed by railroad men ample for the far future, and its size and architectural graces were themes of eulogistic comment. Yet how few years went by before it was relegated to the limbo of real estate dead for railroad uses! And those who see the throngs which pour during the rush hours through the entrances of the great South Station at Boston, lineal successor of the old Boston & Providence terminal, may well doubt whether even its vast spaces fully provide for the future passenger traffic of the two proprietary corporations.

These two examples of expanded passenger terminals of two eastern railroad companies—and the station of the Pennsylvania shifted from West Philadelphia to the center of the city is another past instance—illustrate strikingly enough the familiar fact of the deep importance that terminals in great cities are reaching as a form of railroad evolution. But the general fact, while it expresses a result to be charged primarily to the growth and intensive centrality of urban populations, has some components not so quickly seen, or, if seen, not adequately measured and realized. Not only

is the great passenger station of a great railroad company in a great city a thing vital in that railroad's operation, but it must nowadays be evolved under peculiar conditions of high cost. We do not refer merely to the high price of the acquired realty, but to other factors. The station must be congruous with times in which the luxuries of the past spell the necessities of to-day. The public demand for so-called "conveniences" applies not less to the great railroad station than to the up-to-date hotel or modern college dormitory and the American home. Luxury sets a new pace in the railroad station as elsewhere, and public demand is not only more exacting, but far more censorious if the demand is not conceded. Even the poor man asks from the public service corporation accommodations undreamed of at his own home. Nor, by the way, is it the big terminal station alone that imposes this burden? It rests on the railroad corporation only in less degree on the line at every city of considerable size. Here the rivalry of cities and large towns, each craving the newer or better station of a sister municipality, is apt to come in as a cogent force.

It is a condition, not a theory, that confronts the great railroads in this construction and reconstruction of important passenger stations, and especially of huge terminal stations in the great cities. As to the latter class of stations each corporation faces the unpleasant economic necessity of a vast outlay of money to the interest charge on which the company must grow up slowly and count its returns in fiscal vantages more or less remote from the station itself. This is not true in all cases. If, for example, a railroad by building a new terminal of its own can escape a heavy annual terminal charge for trackage, as well as station privileges, paid to another company, the case is decidedly modified. If, on the other hand it gets satisfactory terminal facilities for an annual payment which is a low interest rate on less than cost, it is a deterrent. But, in general, the dictum of high immediate expenditure and distant returns holds good. The nature of those remote but sure returns in the case of a great passenger terminal therefore becomes interesting and, while situations considerably vary, we may take for illustration the epoch-making instance of the Pennsylvania's immense new passenger terminal in New York, with its sub-river tunnel annexes, a scheme so great, fiscally, that it has even affected the credit—as measured in borrowing power on bonds—of that mighty railroad corporation.

The actual cost of this record-breaking terminal scheme for construction may be roughly estimated at \$100,000,000. On that sum the interest charge alone may be fixed at \$4,000,000 with additions, for operation, taxes, maintenance and the like of, say, \$1,500,000 more. The total of \$5,500,000 is an expansive sum, and it runs in both good and bad traffic periods. But when we come to the net charge there are important offsets. First, there are some tens of millions by which cost and consequently fixed charges are reduced by transfers from surplus earnings to construction of the terminal. There are rents and station privileges sold. There is the rental to be paid by the Long Island Railroad. There are potential economies in the great ferry service of the company either direct or by new development in the line of suburban travel; and, incidentally, the company will thus cover both central and downtown business, advantage owned by no other corporation in any considerable degree. There is the possibility of an increase of a few cents per passenger on an immense volume of passenger traffic. There is the high bid for what we may call "long-distance" business by a road with its terminal in the heart of a metropolis which ere many decades will be the greatest city in the world. There is the ascertained fact that the Pennsylvania traffic doubles within each ten years. Finally, there is the prospective New England connection, with its rents, its trackage charges and its possibilities of diversion of New England business to Pennsylvania routes. The scope of this connection has never been fully recognized. It may be suggested by the annual charge paid by the New Haven to the New York Central for trackage and rents below Woodlawn, a sum which reached about \$1,000,000 several years ago and is greater now; and by the New Haven's costly Harlem improvements and their forecast of electric suburban service along the line of the great city's most rapid advance. One can expand the omen to the point where it includes the complete union of the New Haven and Pennsylvania systems as promoted by the great terminal; an event not likely to come to pass in President Mellon's time, or in any time while New Haven stock remains scattered in small holdings throughout New England.

Here, then, are some ten specific offsets to the burden and risks of the great fixed charge to be incurred by the Pennsylvania in

centralizing its New York terminal. They will undoubtedly leave a considerable margin that may have to be met, perhaps for a good many years. The components in the particular problem are, of course, indeterminate. They rest on unknown variations of value the attempt to measure which must be guesswork. But it must be said that, after the subtractions are made, the Pennsylvania's large equities, including net earnings, over dividends, easily provide for the balance; and beyond is the prospect of net earnings waxing and doubling in much less than ten years.

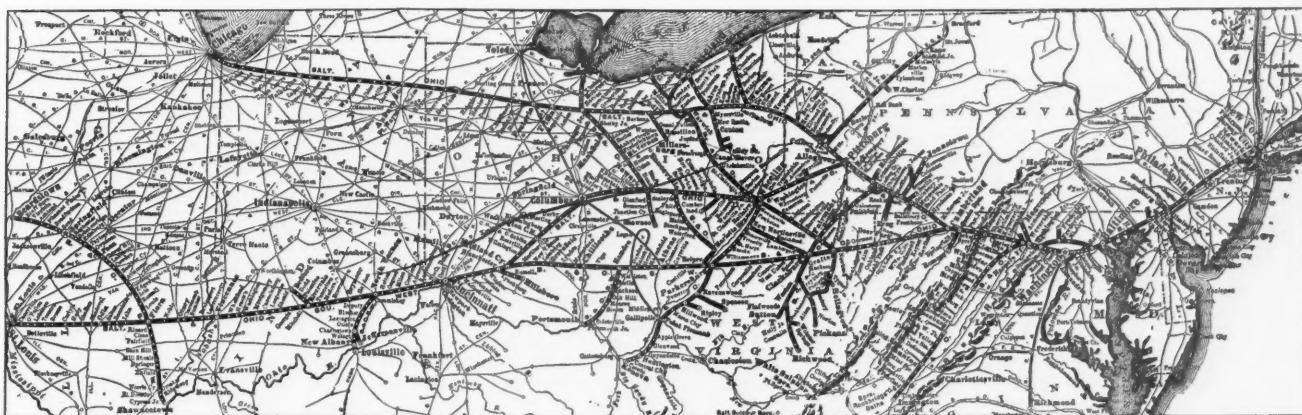
When we come to apply this overshadowing Pennsylvania case to the large passenger terminal problems of other railroad corporations we do not, to be sure, find subtractions from the terminal fixed charge in the same number or of the same values. But, in practically all cases, some of them exist. Even if they did not exist there is in present day railroading the same sort of compulsion to provide for the far future in passenger terminals that has obtained in the earlier past when the trunk lines have sought railroad outlets to the great cities. Where, for example, would the Pennsylvania itself have emerged had it failed to take over at a fixed charge exceeding net earnings the United Railroads of New Jersey, or under like conditions had the Delaware, Lackawanna & Western refused the then directly unprofitable lease of the Morris & Essex? This is the nub of the whole terminal problem. Had the railroads foreseen that problem a third of a century ago they would have forestalled the future by great purchases of urban real estate even at somewhat of the same fiscal perils that attended President Gowen's taking up of

month with another of the same class, that near Sudbury, Ont., where 12 persons were killed, and three others subsequently died of injuries. Canada had also in September a disastrous freight wreck (reported from Port Arthur on the 18th), and Mexico a collision of freight trains on the 26th in which eight were killed.

The number of electric car accidents reported in the newspapers of the United States in the month of September was 21; number of persons killed 10, injured 102.

Baltimore & Ohio.

The Baltimore & Ohio is a trunk line with a soft coal business more important by far than any other item of its traffic. From West Virginia it ships coal east to the Atlantic seaboard markets and west to the Pittsburgh, Ohio, Chicago and St. Louis territory. It is notable that bituminous coal and coke make up 51.5 per cent. of the entire tonnage carried during the year. This is an increased percentage of these products over the year 1905, in spite of the fact that bituminous coal accounts for only 39.8 per cent. of the total as against 42.5 per cent. in 1905. Coke shipments, however, which made up 8 per cent. of the total in 1905, amounted to 10 per cent. last year, an increase of 45 per cent. in this one item of traffic. It must not be supposed, however, that there was an actual decrease in the tonnage of bituminous coal shipped because its proportion of total shipments decreased. On the other hand, bituminous shipments amounted to over \$22,000,000 as against some \$20,100,000 in 1905, a gain of 9 per cent. The average earnings per ton on soft coal were slightly above four-tenths of a cent as against 0.56 cents average earnings on all traffic. The large coal tonnage was also



Baltimore & Ohio.

the Reading coal lands. But if railroad foresight in the matter of great terminals was then too dim, it is clarified now, and fortunately for the shareholders, at a time when the great accumulated resources of the roads enable them to front the problems without any serious risk of impaired dividends.

September Accidents.

The condensed record of the principal train accidents which occurred in the United States in the month of September, printed in another column, contains accounts of 20 collisions, 23 derailments and three other accidents. Those which were most serious, or which are of special interest by reason of their causes or attending circumstances, occurred as follows:

Place.	September	Killed.	Injured.
1. Sea Cliff, Cal.	10th	2	25
2. Ringgold, Ga.	12th	7	0
3. Dover, Okla.	18th	2	19
4. Pulaski, Wls.	19th	2	11
5. Cut Bank, Mont.	20th	4	0
6. Rock Cut, Ohio.	23d	3	9
7. New Prague, Minn.	24th	5	3
8. Catlin, Ill.	26th	9	46
9. Eddington, Pa.	29th	3	20
10. Clarksville, Tenn.	29th	2	0

The most sensational accident in this list was that at Dover, Okla. Its cause seems to have been like that of the similar wreck at Eden, Colo., in August, 1904, in that it was due to an unusual flood and probably to a large mass floating down stream. The vigilance, or lack of it, of the engineer or the officers of the road is a question which, in Oklahoma as in Colorado, remains in the dark, because of the lack of any unbiased investigating authority.

The rear collision at Eddington, Pa., when looked at in this list loses some of its prominence, since six or eight others are as bad or worse. It was, however, exceptional and a discussion of its cause will be found in the editorial columns of this and last week's issues.

Though Eddington was exceptional it occurred in the same

responsible for the high average train load, which was 420 tons of revenue freight as against 399 tons in 1905.

The trunk line character of the road is reflected in the large grain tonnage; this amounted to 1,594,971 tons, which is less by 100,000 tons than the highest figure for grain tonnage in the history of the road, reached in 1900. In 1905 the Baltimore & Ohio carried 1,107,789 tons of grain. Besides this notable increase of 487,182 tons in grain, other large increases were: ores, 402,216 tons; stone, sand, etc., 586,906 tons; forest products, 359,021 tons; cement, brick, lime, etc., 421,876 tons, and ore and steel products, including machinery, 1,546,000 tons. The last figure is an evidence of the tremendous prosperity of the iron and steel trade which the Baltimore & Ohio reaches in the Pittsburgh, Cleveland and Chicago districts. There were few decreases in traffic, the most striking ones being of 140,000 tons in anthracite coal and another of 30,000 tons in packing house products other than dressed meats, the latter an echo of the Chicago packing house investigation.

With all these large increases in traffic, there was, of course, a great gain in freight earnings, amounting to \$9,395,000. A decrease of \$115,000 in earnings from passenger traffic, due to comparison with the St. Louis Exposition year was more than overcome by a gain of the same amount in earnings from miscellaneous sources and an increase of \$297,000 in express earnings, which is, according to the report, the gratifying result of improvements made in that service. The gain in miscellaneous earnings was largely due to increased elevator earnings at Baltimore from the much larger traffic in grain.

Perhaps the most striking feature of the year's operations is the apportionment of the expense increase, which amounted to over \$4,800,000. Of this amount \$1,478,000 was in maintenance of way; \$1,578,000 in maintenance of equipment and \$1,655,000 in conducting transportation. It will be noticed that these amounts are roughly about the same. As the total maintenance of way cost was something over \$9,000,000 and maintenance of equipment \$12,500,000, as against over \$26,000,000 for conducting transportation, it will at once be seen that proportionately much larger amounts of the in-

creased expenses went into maintenance than into the actual cost of carrying traffic. This, of course, is a desirable result, for it means that operation is becoming more efficient and increased expenditures are going into the improvement of the road.

There are many other evidences of the large and general improvement of the property. From the income of the year, \$1,077,975 was appropriated for certain miscellaneous improvements and betterments, and expenses of topographical and right-of-way maps, and \$3,000,000 for extraordinary additions and improvements, a total of \$4,000,000 appropriated out of net earnings. Construction charges and miscellaneous improvements are listed in great detail, with the cost set opposite each item. These expenditures amounted to something over \$9,000,000, which, less the \$3,000,000 appropriated out of surplus income, left \$6,000,000, which was charged to capital account. Of the miscellaneous improvements all but \$120,000 were charged to income account. The analysis of these charges occupies 14 pages of the report, which suggests the general thoroughness of the document's presentation of the company's financial situation and operations.

Many of the improvements are also mentioned by the President in considerable detail. They include, in particular, double tracking, relocation of the lines and consequent grade and curve reduction. For example, on the Baltimore division there has been under construction during the year a new standard double track line, three miles long, where except for half a mile which will be raised and straightened the present roadbed is being entirely abandoned and relocated. This improvement is to eliminate 542 degrees of curvature, reduce the maximum curvature from 12 to 7 degrees, shorten the distance by over half a mile, reduce the maximum grade westbound from 0.9 per cent. to 0.5 per cent., and put the roadbed well above high water. The longest stretch of double track under construction is 25.7 miles; this involves grade reduction to the Baltimore & Ohio standard of 0.3 per cent. and reduction of curvature to a maximum of $1\frac{1}{2}$ degrees. When this is finished there

siderable importance to the road after the great disorganization of its facilities at the time of the fire. During the year, two of the distinctly Pennsylvania Railroad directors have left the board of directors, one by death, the other by resignation.

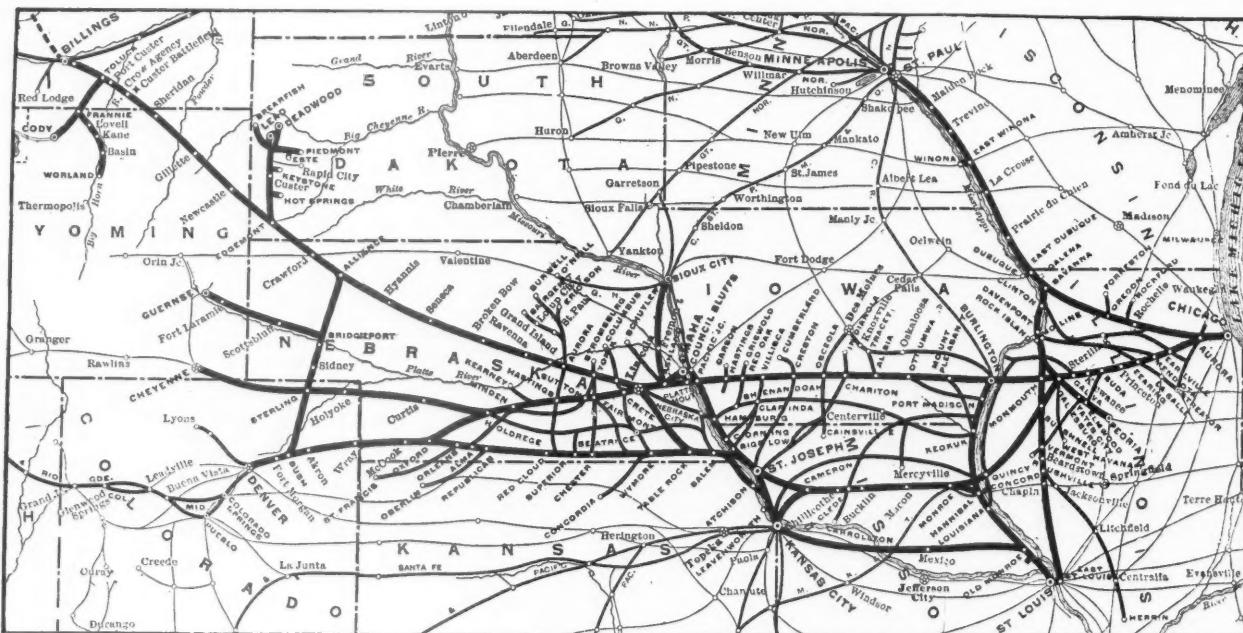
The most striking event, of course, as it affects the Baltimore & Ohio, has been the sale by the Pennsylvania of about \$40,000,000 of its B. & O. stock, or about one-half its interest in the road, to Kuhn, Loeb & Co. These shares are reported to have already come into the possession of the Harriman interests. As the eastern end of the Harriman system the Baltimore & Ohio would be a still more important railroad than it is to-day. The great gain made since receivers were appointed in 1896 is typified by the raising of its dividend during this, the eightieth year of its history, from an annual rate of 5 to 6 per cent.

The principal results of operation of the system, including the Baltimore & Ohio Southwestern, but excluding 456 miles of controlled or affiliated lines not worked directly, are as follows:

	1906.	1905.
Mileage worked	4,030	4,026
Freight earnings	\$60,002,204	\$50,607,087
Passenger earnings	13,701,698	13,817,141
Gross earnings	77,392,056	67,689,997
Maint. way and structures	9,330,859	7,852,636
Maint. of equipment	12,514,984	10,937,106
Conducting transportation	26,198,469	24,543,341
Operating expenses	49,515,221	44,710,604
Net earnings	27,876,835	22,979,394
Net income	19,142,275	14,159,775
Betterments and improvements	4,077,975	3,092,196
Year's surplus	8,926,898	5,667,194

Chicago, Burlington & Quincy.

There are, since the acquisition of the road by the Great Northern and Northern Pacific in 1901, two Chicago, Burlington & Quincy companies. The road is owned by the Railroad company of that name, which leases it to the Chicago, Burlington & Quincy Railway



Chicago, Burlington & Quincy.

will be, with the exception of one tunnel, a continuous second track from Pittsburg to Hamler, on the Chicago division, 278 miles. Both of these pieces of work are to be finished during the present fiscal year.

After considerable public agitation and negotiation with the state of Maryland, the 5,500 shares of stock of the Washington Branch Railroad held by the State and also a number of shares held by individual interests were acquired. This is the Baltimore & Ohio line into Washington. It was alleged that funds were being diverted from net earnings of this branch to improvements to such an extent that the stockholders, including the State, were not receiving their fair share of surplus, no dividends having been paid since 1896. They contended that they should receive some return particularly in view of the great importance of a line into Washington to the Baltimore & Ohio. The interest of the state of Maryland in the stock entitled it to two representatives on the board of directors. By the purchase this privilege was terminated and the road brought entirely under the control of the Baltimore & Ohio.

The new general office building to replace the one burnt in the Baltimore fire was occupied on September 12, 1906, an event of con-

Company. The Railway company pays as rental dividends at the rate of 7 per cent. yearly on the stock of the Chicago, Burlington & Quincy Railroad Company. Most of the Railroad company's stock is deposited as collateral security for the Northern Pacific-Great Northern joint C. B. & Q. collateral 4 per cent. bonds, and the dividends paid on this stock are applied directly to the payment of interest on these collateral bonds. There is at the same time outstanding a small amount of the Railroad company's stock not deposited as collateral on which the same rate of dividend (7 per cent.) is paid. Although the lines are operated by the Railway company, the annual report—the 52d of its kind, by the way—is made by the Chicago, Burlington & Quincy Railroad Company.

It is, of course, a matter of common knowledge that since purchase by the two transcontinental lines the value of the road has been greatly increased and its operation made much more profitable. The tremendous expansion of railroad earnings in its territory has been, of course, the fundamental factor in bringing this about. At the same time, Hill operating methods have been introduced with consequent increase in efficiency. Most of the income above the amount necessary to pay interest on the purchase bonds has been

turned back on the road, with the result that very large improvements have been made.

The past year's operations are a most striking example of this policy. Gross earnings of all roads operated and controlled, a total mileage on June 30 of 8,927 miles, were over \$74,000,000, against less than \$66,000,000 in 1905. An increase of \$8,000,000 would under normal conditions represent an increase of at least from \$2,000,000 to \$3,000,000 in net earnings. Net earnings for 1906 were, however, smaller by \$1,000,000 than in the previous year. The larger net earnings which would otherwise have been shown were turned into the maintenance account. Although no detailed table of operating expenses is given, the simple ratios of the different expense accounts to gross earnings mark clearly the large maintenance costs. In the first place, operating expenses as a whole were 69.4 per cent. of gross, as compared with 64 per cent. in 1905. In that year maintenance of way was 13.8 per cent. and maintenance of equipment 14.8 per cent. of gross earnings. Last year maintenance of way was 15.2 per cent. and maintenance of equipment 18.4 per cent. of gross. There was a decrease of one-half of 1 per cent. in the proportion of general expenses and an increase of a little less than one per cent. in the proportion of conducting transportation to gross earnings. Thus of the increase of 5.4 per cent. in the ratio of operating expenses to gross earnings, 5 per cent. was in the two maintenance accounts. This undoubtedly reflects a raising of standards. It is not possible to determine unit figures for maintenance of equipment, but there is no doubt that they were unusually high. Maintenance of way figures out at \$1,287 per mile against \$1,063 in 1905, both high figures in view of the large amount of branch line mileage and the freight density of only 737,000 ton miles per mile of road. With the large increase in traffic, the small rise in cost of the two non-maintenance accounts is at the same time proof of operating efficiency.

Aside from the statement of earnings, there is little information of operations given except in a table of traffic statistics. No further proof of the expanding business of the road is needed than the statement that the revenue ton mileage increased by over 1,100,000. Growing operating efficiency is also shown by a rise in the revenue train load from 327 tons in 1905 to 365 tons, or over 10 per cent. As a result, although there was a decrease of 0.03 cents in the average ton mile rate received, earnings per freight train mile rose from \$2.73 in 1905 to \$2.94 last year. Earnings from freight traffic were larger by \$7,300,000 than in 1905. Owing, no doubt, to comparison with a year ago, which included most of the St. Louis World's Fair travel, there was a decrease of 8,900,000 in number of passengers carried one mile. Although there was a decrease in passenger mileage, the number of passengers carried increased from 14,900,000 in 1905 to 15,500,000 in 1906, and passenger earnings, by about \$500,000, due to a gain of 0.09 cents in the average passenger mile rate received. Instead of furnishing 24 per cent. of the gross earnings as in 1905, passenger earnings, not including mail and express, made up only 22 per cent. of the total.

The principal new construction of the year was an extension in Wyoming to reach the Wind River or Shoshone Indian Reservation, opened to settlement this summer. This line, which is 91 miles long, runs from Frannie, Wyo., a point on the Cody branch near the Montana boundary, south to Worland. Cody, which is about 50 miles east of the Yellowstone National Park, is the westernmost point reached by the Burlington lines. A 60-mile extension from Centralia, Ill., to Herrin, now the southernmost point reached by the Burlington, was opened to business March 5, 1906. Although not mentioned in the report, there has been another important piece of new building by the road. This is a connection between the Burlington lines in the neighborhood of Omaha and the Great Northern line reaching southeast to Sioux City. This line, which runs from Ashland, Neb., to Sioux City, 108 miles, was opened for traffic in August, 1906. By its means traffic can be sent from the network of Burlington mileage in Nebraska to St. Paul, Minneapolis and Duluth, and in return from the eastern part of the Great Northern's territory to the Burlington. The new line is in particular a competitor of the Chicago, St. Paul, Minneapolis & Omaha line of the North-Western. The year's construction and equipment account was charged with \$1,274,725 for the Frannie-Worland line and \$943,162 for the Centralia-Herrin line. There was also a small charge for work already done on a new line from Lincoln, Neb., including a new yard at Lincoln, west to Milford, 20 miles, which amounts to a second track.

More important, possibly, in its bearing on future policy, than anything else in the report is a charge of \$82,000 to construction account for a new line to be built from Newark, Neb., northwest along the Platte and North Platte rivers to Bridgeport. Bridgeport is the eastern terminus of the Burlington's line which runs to Guernsey, Wyoming. To reach this line it is now necessary to carry traffic either south around by way of Sterling, Col., or north by the Alliance, Neb., line. As the main line of the Union Pacific parallels the route of this new line for 100 miles from Newark to North Platte and the Harriman road is building a branch from North Platte, the remaining 125 miles to Northport, which is across the

river from Bridgeport, it hardly seems as though the Burlington could be planning this new construction for the sake of local traffic. Nor does it seem probable that this 225 miles of road would be built for the sake of reaching more conveniently a 100-mile branch. But such a line would be of great importance if the Guernsey branch ever came to be the outlet for a large amount of Burlington mileage, as yet unbuilt, in southern Wyoming, and of the greatest importance as part of a through line to Salt Lake City or the California coast; an ultimate event by no means beyond the bounds of possibility.

The principal results of operation for the last two years are as follows:

	1906.	1905.
Mileage worked	8,896	8,871
Freight earnings	\$51,168,339	\$43,863,893
Passenger earnings	16,409,104	15,898,243
Gross earnings	74,146,661	65,973,046
Maint. way and structures	11,312,712	9,090,499
Maint. of equipment	13,639,942	9,788,194
Conducting transportation	22,354,707	19,352,656
Operating expenses	51,463,642	42,230,333
Net earnings	22,683,029	23,742,713
Net income	12,742,430	13,804,778

NEW PUBLICATIONS.

Catechism of the Electric Headlight. By J. W. Johnson. Indianapolis: Published by the Brotherhood of Locomotive Firemen's Magazine. 3 in. x 5 in.; 94 pages.

This booklet consists of 296 questions and answers covering the operation, repairs and maintenance of Pyle National headlights and generators. The catechism is a reprint, revised and brought up to date, of a series of articles written by Mr. Johnson for the *Locomotive Firemen's Magazine* in the early part of 1905.

Convention of the Superintendents of Bridges and Buildings.

The sixteenth annual convention of the Association of Railway Superintendents of Bridges and Buildings was held at the American House, Boston, Mass., October 16, 17 and 18. There were 77 present out of a total membership of 348. Mr. Lucius Tuttle, President of the Boston & Maine, delivered the address of welcome. The Secretary reported the addition of 35 members since the last meeting and a balance of \$1,103 was reported in the treasury. The officers elected for 1907 are: President, J. H. Markley (Toledo, Peoria & Western); First Vice-President, R. H. Reid (L. S. & M. S.); Second Vice-President, J. P. Carty (B. & M.); Third Vice-President, H. Rettinghouse (Wis. Cent.); Fourth Vice-President, F. E. Schall (Lehigh Valley); Secretary, S. F. Patterson (B. & M.); Treasurer, C. P. Austin (B. & M.); Members Executive Committee, W. O. Eggleston (Erie); A. E. Killam (Intercolonial); J. S. Lemond (Southern); C. W. Richey (Penna. Lines); B. J. Sweatt (C. & N. W.), and H. H. Eggleston (Chicago & Alton). Salt Lake City, Utah, was selected as the next place of meeting.

Only four of the seven special committees submitted reports. The first of these was on Concrete Bridges, Arches and Subways. The subject was freely discussed and created a good deal of interest. All of those who spoke were in favor of concrete construction. A number of instances were cited by members where concrete had been used for whistle posts, mile posts, fence posts, ash pits, bridge bearing blocks and abutments, arches, culverts, buildings, etc. The discussion developed that the best results were obtained with wet concrete. Concrete can be put in in winter with as good results as in summer provided the forms are allowed to stay in place until the concrete is thoroughly dry. This in some cases may take from two to three months. Mr. R. H. Reid (L. S. & M. S.) stated that on his road, where stone is easy to get, concrete is cheaper to put up than masonry, and in some cases it can be put in where it would be impossible to use stone on account of traffic conditions interfering with the handling of large stones. In using reinforced concrete it was the general opinion that the reinforcing bars of from 1 inch square and up should have at least from 12 in. to 15 in. lap in order to be effective.

There were no reports on subjects No. 2 and 3: Experience and Use of Concrete and Tile Piles and Concrete Building Construction. Several members, however, witnessed a demonstration of the driving of some concrete piles by the Simplex Concrete Piling Co. at the new freight house of the N. Y., N. H. & H. in Boston, where the company is driving about 200 piles to an average depth of 30 feet.

A printed report was submitted on subject No. 4: Method of Watering Stock in Transit. The discussion of the subject was short.

On subject No. 5, Recent Practice in Cofferdam Work, a printed report was submitted. Little discussion was offered further than that steel piling in many cases cannot be recovered. Mr. Reid said that in one case he had pulled 1,000 tons without moving a pile. He said it was an open question whether it paid to use steel in place of wood piling when the cost of re-covering was taken into consideration.

The next subject, No. 6, was on Modern Coaling Stations and

Concrete Pits. A printed report was submitted and discussion was mainly on the cost of handling coal. No definite conclusions could be arrived at, as it was evident from the great variations in cost of handling per ton (from 1½ cents to 17 cents) given by the members as the cost on their various lines that some of them had included only the actual handling of the coal at the coaling station, whereas others had included the cost per ton, interest on the investment, maintenance of plant, etc.

A printed report was submitted on subject No. 7: Bumping Blocks for Passenger and Freight Use. It was the unanimous opinion that 95 per cent. of breakages of bumpers were due to lack of discipline among the train crews. A number of the members thought spiral springs preferable to rubber in bumpers. The cost of maintenance of bumpers fitted with springs is less and bumpers so fitted have proved to be more efficient.

The standing committee subjects, of which there were eight, were next taken up. There was a printed report on the first subject: Pile and Frame Trestle Bridges. One of the members stated that he had had excellent results from the use of gravel deck trestles. These, it was stated, are good for from 10 to 12 years without repairs. Mr. Cummin (L. I.) exhibited a piece of a creosoted pile which had been in Jamaica Bay for over 20 years. It was in a state of perfect preservation. He also exhibited a piece of pile which had not been treated, but which had been in service, for a much shorter time, next to the creosoted pile. This was badly decayed and eaten by the teredo. There were no reports on subjects Nos. 2, 3, 4, 6 or 8, namely: Steel Bridges, Buildings, Water Supply, Fences, Road Crossings and Cattle Guards, Records and Accounts. Printed reports were submitted on subjects No. 5, Fire Protection, and No. 7, Preservatives for Wood and Metals. A short discussion was given to subject No. 4, Water Supply. This was principally on hoops for water tanks and the cause of their failing. Most of the members thought that the hoops should be made a trifle larger. They also found that it was rare for wrought iron hoops to fail; the majority of failures had been with steel hoops. The question was asked as to whether the kind of wood used had any effect on the lasting quality of the hoops. J. B. Sheldon (N. Y., N. H. & H.) said that hoops on tanks made from white pine lasted longest and that hoops on cedar and cypress tanks did not wear as well. Galvanized wrought iron hoops give good results, it was said by one member. Others had used round hoops, but with poor results, as they cut into the wood and break the fiber, and at the same time leave a recess for the water to accumulate which in time tends to rot the wood around the hoops.

A short discussion was given to subject No. 7, Preservatives for Woods and Metals. Mr. Reid stated that carboineum is an excellent material for preventing outside rot. The majority of the members seemed to think that the application of almost any oil would tend to prolong the life of timber. J. F. Parker (A. T. & S. F.) said that his road had used crude oil extensively and with good success for painting all of its trestle work and wooden bridges. It prevented the timber from checking in the hot sun and also prolonged its life. There was no report on Records and Accounts, and it was decided to drop this as well as subjects Nos. 2 and 3—Steel

Bridges, and Buildings—from the list of standing subjects of the Association, thus leaving five standing subjects in place of eight.

The subjects for next year are: (1) Concrete Bridges, Arches and Subways; (2) Concrete Building Construction; (3) Expansion and Contraction of Long Concrete Walls, either Reinforced or Plain Concrete; (4) Action of Sea Water on Concrete; (a) Made in Air and Sunk in Sea Water, (b) Concrete Deposited Direct Into Sea Water; (5) Wooden and Asbestos Smoke Jacks for Engine Houses; (6) Combination Fastenings and Locks for Rolling and Sliding Doors on Freight Houses and Other Buildings; (7) Construction of Towers and Guides for Lights on Draw-Bridges; (8) Protecting Steel Railroad Bridges Against the Action of Salt Brine from Refrigerator Cars.

The following is a list of the exhibits at the convention:

American Hoist & Derrick Co., St. Paul, Minn.—Photographs of hoists and derricks.

The American Track Barrow, Lowell, Mass.—Models of timber track trucks, and pony cars.

Barrett Mfg. Co., New York.—Barrett "Specification" pitch, and Barrett "Specification" coal-tar felt.

F. W. Bird & Son, East Walpole, Mass.—"Paroid" roofing, "Neponset" waterproof papers; "Paroid" sill covers, "Neponset" and "Kosat" insulating papers, coated building paper and "Parine" paint and cement.

J. A. & W. Bird & Co., Boston, Mass.—Samples of "Rex Flintkote" roofing, "Ibex" building and insulating papers; model house showing application of roofs.

Philip Carey Mfg. Co., Cincinnati, and New York.—"Carey's" roofing and "Carey's" roofing paint.

Paul Dickinson, Inc., Chicago.—Cast-iron smokejacks for engine houses; ventilators and chimneys for freight houses and signal towers.

Joseph Dixon Crucible Co., Jersey City, N. J.—Photographs of structures protected with Dixon's "Silica-Graphite" paint.

Easton Granite Roofing Co., New York.—Granite roofing.

Fairbanks, Morse & Co., Chicago.—Gasoline inspection cars in operation on track, also Barrett jacks.

Ideal Concrete Machine Co., South Bend, Ind.—The Ideal concrete block machine in operation.

H. W. Johns-Manville Co., New York.—Asbestos "side," asbestos roofing asbestos "Transite" smokejacks, and asbestos packings, pipe coverings, etc.

The Lebon Co., Chicago.—Samples of "Roofrite" roofing material.

Lowe Bros. Co., Dayton, Ohio.—Films of Lowe's "Red Lead Lute" paint.

McCord & Co., New York.—Model of "Gibraltar" bumping post.

The National Roofing Co., Tonawanda, N. Y.—Sample rolls of "National" mineral asphalt roofing.

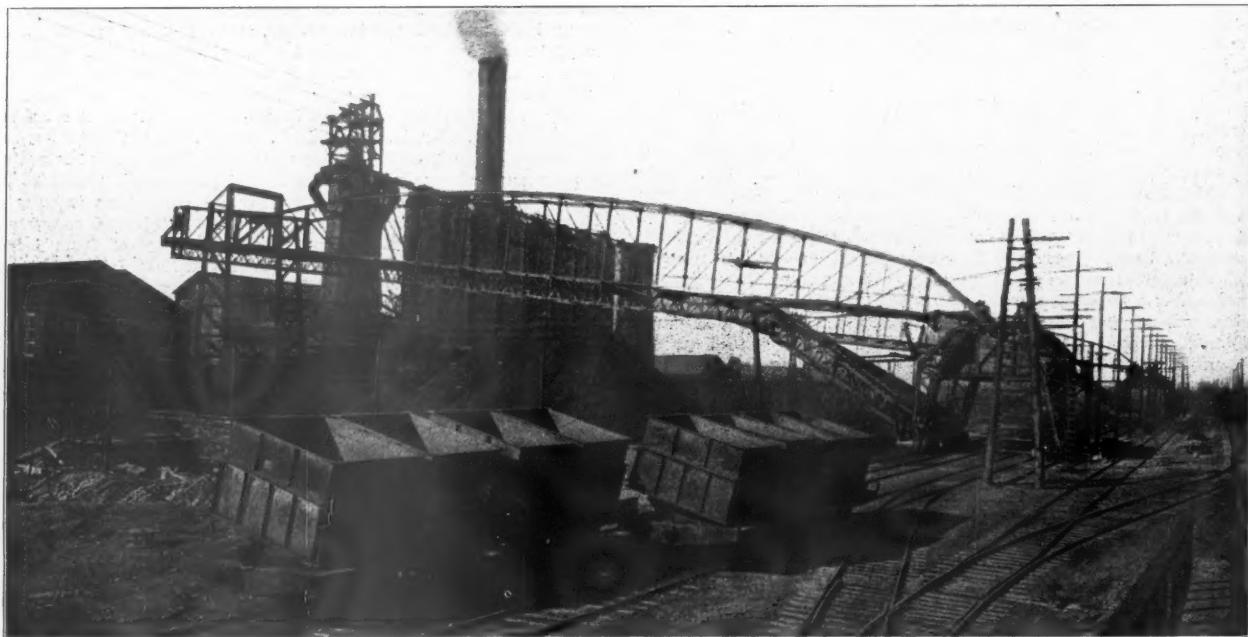
A. O. Norton, Boston, Mass.—Ball-bearing, lifting jacks, and sure-drop jacks.

Standard Paint Co., New York.—"Ruberoid" colored roofing, "Flexite" paints and "P. & R." insulating paper.

United States Graphite Co., Saginaw, Mich.—Graphite paint and lubricants.

Hulett Car Dumping Machine.

The use of mechanical unloaders and conveyors at the ore receiving ports on the Great Lakes has so reduced the time and cost of unloading cargoes that similar labor saving devices are being installed on an extensive scale at some of the larger inland plants for emptying the cars and placing the material on the stock pile. For removing the contents of the cars as they arrive by rail the Hulett car dumper is in service at several works. The loaded cars are moved by a gravity track to the edge of the incline approach to the machine. Here the car is engaged by a mule car usually propelled by a cable. The mule car runs on a pair of narrow gage tracks between the rails of the standard gage track, and after pushing the loaded car on the cradle, runs back down the incline, dis-



Hulett Ore Stocking Bridge Showing Bridge Cars in Position on Transfer Cars; Carnegie Steel Co., Youngstown, Ohio.

appearing into a pit at the foot of the incline, so that loaded cars can pass over and in front of it. It is provided with a strong friction stop to relieve the impact when it drops into the pit, and hence allows greater speed of manipulation as it requires less attention from the operator and automatically stops itself in the pit. After the loaded car is placed on the cradle of the machine it is automatically moved over to the side against suitable supports

dumped at any point desired by means of a movable trip placed on the track. After dumping the car automatically closes and latches itself and is returned down the incline to its original position on the transfer car. The contents of each bridge car are equivalent to 20 gross tons of iron ore, so that four of them will receive the contents of the largest railroad cars, or the contents of two ordinary 40-ton cars. The capacity of each of these conveyor bridges is about 400 to 500 gross tons per hour, under ordinary working conditions. The conveyor bridge is built with a separate track hung underneath the floor beams. On this track runs the trolley wagon operated by cables on separate drums located in the main tower of the machine. The trolley wagons and machinery are designed to operate either an automatic bucket or a drag bucket. The capacity of the drag bucket is 10 tons, while the automatic bucket for the same bridge will hold $6\frac{1}{2}$ tons of ore. By the use of either one of these buckets, the ore is picked up from the stock pile and carried back. The cantilever of the bridge extends over the bins of the furnace, and the ore from the bucket is dumped direct into the bins or into a bin filling the car as desired.

These bridges are operated electrically by two 130 h.p. reversible open type motors which actuate the bridge car haulage and bucket-operating drums. The car haulage drum is of two diameters, 5 ft. and 8 ft. respectively, so arranged that the haulage rope is wound on the smaller drum while the car is being pulled up the steeper part of the incline; and when the car reaches the more level part of the track, the rope, by means of a spiral groove, runs on the 8-ft. diameter, which gives greater speed throughout the bridge. For moving the bridge back and

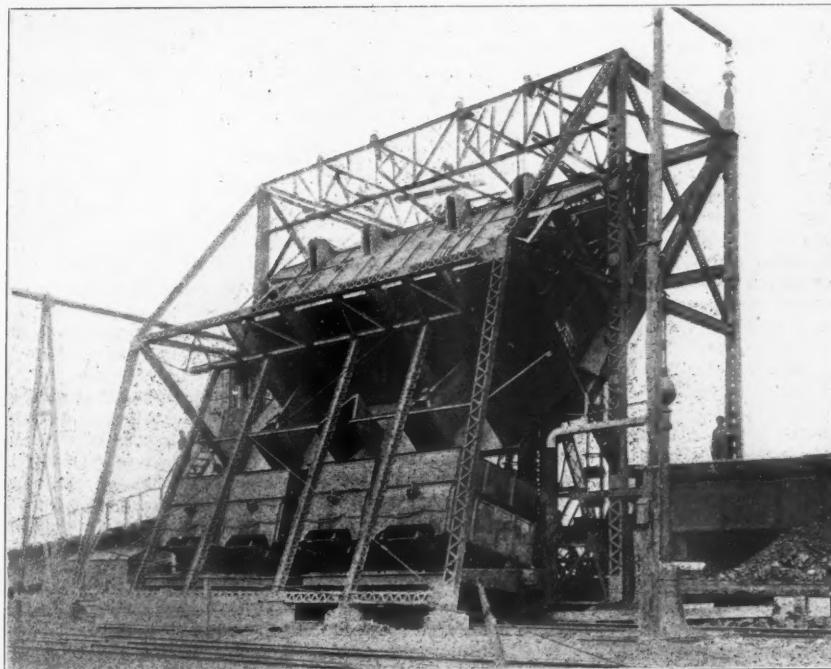


Bridge Car Discharging Load over Stock Pile.

on the cradle. It is not necessary to clamp the car independently as this is automatically done by counterweight clamps which operate simultaneously with the inverting mechanism of the car dumper. The cars are inverted to an angle of 70 deg. so that all the contents run out freely, and when the car is emptied and revolved back the clamp beams release and the car stands entirely free. The next incoming car bumps the empty and starts it down the discharge track. It leaves the machine and yard by gravity tracks having spring switches. These dumpers have a capacity for handling from 140 to 170 loaded cars in a day of ten hours or for emptying over 7,500 tons. They are operated by steam or electric motors requiring two 80 h.p. motors for the tipping mechanism.

For transferring the ore to the stock pile a conveyor bridge of the Hulett type has been designed for stocking and reloading which operates in direct connection with the railroads entering the works, so that the locomotive of the ore train is utilized as well as the car dumper described. As the ore arrives at the furnace in either gondola or hopper bottom cars, the car dumper empties the ore from the railroad car into four bridge-cars which are mounted on tracks on a transfer car, the tracks on the transfer car being at right angles to the standard gage tracks on which the transfer car travels. After the railroad car has been inverted in the car dumper, and the ore dumped into the bridge cars, the transfer car is pushed out from under the car dumper by the locomotive, which at the same time pulls in another transfer car with empty bridge cars. The locomotive then leaves the empties and shoves the loaded cars up to and opposite the incline approach of the ore bridge. It is not necessary for the locomotive to spot the car accurately as the bridge is provided with a shifting gear which moves the transfer cars until the tracks on the bridge coincide with the short tracks of the transfer car. The operator by dropping a lever connects the rails on the transfer car with the rails on the bridge, and a continuous track for all four cars is obtained. Another operator attaches a haulage rope to each bridge car in succession and it is pulled up the incline and out over the stock pile by a cable.

The bridge cars are side dumping and can be automatically



Hulett Car Dumper Inverted.

forth along the stock yard, power-driven mechanism is supplied, connecting both the machinery tower in front and the shear leg at the rear. The driving gear for this moving mechanism is located on one end of the intermediate shaft. The connecting gear is operated by a jaw clutch and is bronze bushed for running loose on the shaft. Branch shafts for connecting all the trucks of machinery tower and shear legs are driven from this gear.

The Lumber Business of the Government.

A natural feeling among lumbermen toward the forest work of the Government is that the Government is not in the lumber business and cannot, therefore, take the lumberman's business point of view. Hardly a greater misconception could exist. As a

dealer in stumpage, the Government is the largest lumber dealer in the country. Further, it applies to its sales the practice of scientific forestry, requiring the removal of the timber under the same sort of instructions which it advises for private operators. Thus the Forest Service, in its reserve work, is giving an object lesson on a huge scale to enforce its teachings that conservative management and profit may go hand in hand. In the year 1905 the total sales reached a value of \$273,660.

The restrictions governing the timber sales, while effective, are simple. Application is made to the local officer in charge of the reserve from which the timber is desired, who executes small sales on the ground. In case of large sales, the application is forwarded to the Forest Service, from which the advertisement of the sale is made. Applicants for timber are required to send sealed bids to the Forest Service. Small bidders enjoy exactly equal opportunities with large, and monopolization is effectually fore stalled. The highest bid fixes the price. Should the first applicant desire to begin cutting immediately he may (except in California) do so, on condition that he pay in advance at a price already fixed by the Forest Service, and that he obligate himself to pay the full amount named in the highest bid. Thus delay is avoided and the Government is protected. Speculation in reserve timber is made impossible by the provision that the timber must be removed within a specified time, and that when a contract extends over several years a proportionate amount of timber must be removed each year. Five years is the extreme limit of a sales contract.

That these restrictions are not onerous is shown by the numerous sales made under them. A single sale of 50,000,000 ft. of lodgepole pine for railroad ties is pending on the Montana division of the Yellowstone Forest Reserve. It is estimated that 165,000,000 ft. B.M. of lodgepole pine can be taken from one watershed in the Medicine Bow Forest Reserve, still leaving a large percentage for future crops. Much timber is sold in small lots; 50 applications for such sales are made to each single application for 1,000,000 board feet or more; the prompt, businesslike consideration accorded such applications standing in marked contrast with the slow methods once prevailing, when all applications had to be made through Washington.

Forests as Revenue.—During the year 1905 the sales of timber from the national reserves were as follows:

The largest sales so far made are 71,466,537 board feet from South Dakota, 68,255,916 from Wyoming, and 5,327,443 from Utah.

In sales of wood for fuel South Dakota led with 29,844½ cords; Arizona followed with 16,649, and Colorado with 10,795½. The total number of cords sold was 74,120.

In sales of posts and poles Montana led with 119,500, followed by Wyoming with 30,750, and Colorado with 13,988. The total number sold was 188,740.

The largest timber sales were made in Wyoming, where they reached \$143,895. South Dakota's sales ranked second in value, amounting to \$78,958, and Colorado's to \$23,987. The total sales for 1905 reached \$273,600.

Nor are the receipts from these sales swallowed up by the cost of administration. The entire property of the forest reserves, worth \$250,000,000 in cash, is now being administered at a cost of less than one-third of 1 per cent. of its value, while increase in that value of not less than 10 per cent. a year is taking place. As the use of the reserves increases, the cost of administration must, of course, increase also, but receipts will certainly increase much more rapidly. The time is not far distant when the forest reserves will become self-sustaining. Later they may confidently be expected to become a source of public revenue.—*The National Geographic Magazine.*

The Railway Signal Association.

The annual meeting of this association was held at the New Willard Hotel, Washington, D. C., October 16, 17 and 18, and it was by far the best attended and most enthusiastic meeting that the association has ever held. Two hundred and twenty-eight members and about three hundred guests of members registered their names with the secretary, a good many members having brought their wives. The membership of the association is now over 600. The supply men have formed an organization, the Signal Appliance Association, and 45 firms, members of the association, were represented in the exhibits. These were displayed in a large room on the same floor with the meeting room, except some full-size automatic electric signals, in operation, which had to be left outdoors. On the same floor (the tenth) a luncheon was provided each day, by the hotel, at the instance of the executive committee, thus doing away with the inconveniences and delays which arise when the members scatter to a number of different places to eat. So well had the local committee done its work that at the close of the meeting there was a strong sentiment in favor of having the next annual meeting held in Washington; but advocates of a more central location finally prevailed, and Milwaukee was selected.

The annual election of officers for the ensuing year resulted in the choice of Messrs. Peabody and Rosenberg for president and secretary, respectively, and their portraits, with that of the retiring president, are given herewith.

Mr. J. A. Peabody, Signal Engineer of the Chicago & North-Western, the newly-elected President of the Railway Signal Association, was born in Chicago in 1870. He began his railroad service on the Baltimore & Ohio in 1888. He was in the Maintenance of Way Department, west of the Ohio, until 1892, and then for two years was in the Engineering Department, serving both on the eastern and the western lines. In 1894 he left the road and went to the Paige Iron Works, of Chicago, where he remained four years. In 1896 he became roadmaster on the Chicago & North-Western and in 1902 was appointed to the position which he now holds.

Charles H. Morrison, the retiring President of the association, is Signal Engineer of the Erie.

He was born in 1870 at Dayton, Ohio, and after leaving high school took a special course in mechanical engineering. He began railroad work in 1892 as a draftsman on the Chicago, Milwaukee & St. Paul and, in 1893, was appointed signal inspector of that road. In 1901 he went to the Railroad Supply Company, Chicago, as Assistant Signal Engineer. The next year he returned to railroad service as special inspector, reporting to the General Manager, of the Chicago, Rock Island & Pacific; and later in the same year was appointed to his present position of Signal Engineer of the Erie. On November 1, 1905, he was made also Secretary of the

Electric Traction Commission of the Erie.

The new Secretary of the Association, Mr. C. C. Rosenberg, is a former president of the association and is one of its best known members.

He has just retired from the position of signal engineer of the Lehigh Valley and had intended to devote himself to his private interests. These, however, will not take the whole of his time, and his election to the secretaryship is due to the decision of the executive committee that the office needed to be filled by a man having more time to devote to its work than can be spared by any one engaged in active railroad service. Mr. Balliet could no longer give the necessary time. Mr. Rosenberg's whole railroad service has been on the Lehigh Valley, where he began in November, 1875, as a carpenter's helper. He was promoted successively to the positions of foreman and master carpenter, and in the latter position had charge of the mechanical signaling of the road when it was in its infancy. While in the bridge and building department he had charge of that part of the work in the construction of the Easton & Amboy Railroad, now the main line of the Lehigh Valley from Easton to Jersey City. For one year he was in charge of the company's creosoting works at Perth Amboy, N. J. When the signals of the road became sufficiently important to be put into a department by them-



J. A. Peabody.



C. H. Morrison.



C. C. Rosenberg.

selves, Mr. Rosenberg was made signal engineer, which office he has held until this year.

A full report of the proceedings of the Association will be given in the *Railroad Gazette* next week.

Acworth on Pennsylvania Railroad Finances.

W. M. Acworth, the eminent English railroad expert who was recently in the United States, made an investigation of the Pennsylvania Railroad. He has summed up the information he obtained and the conclusions he reached in an article published simultaneously in the *London Statist* and the *Wall Street Journal*. Mr. Acworth says:

Since I have been in this country I have been trying to form for myself a definite opinion whether the Pennsylvania Railroad is still, as I have always believed, an ultra-conservative company, or whether, as many people in England and some in America believe, it has abandoned its old traditions, been badly bitten with megalomania, and gone in for a policy of reckless extension which may end in imperiling the modest 6 per cent. dividends of its common stockholders. With this object I have been traveling over the road, poring over figures and eliciting the opinions of a number of railroad men and financial experts. As a result, I am inclined to agree with one friend, a man of great experience in railroad matters both on the operating and on the financial side, that, so far from having spent too fast and too freely, the Pennsylvania Railroad might well spend faster and more freely and yet have no fear of even catching up with its available traffic.

Of one thing I am fully satisfied. The Pennsylvania Railroad is not yet overcapitalized. The total capital is roughly 500 million dollars, 300 millions stock and 200 millions bonds. And its gross earnings from operation are 136 million dollars. In other words, the company turns over its capital once in every four years. English railroads are capitalized at about six billion dollars and their gross earnings are about \$550,000,000 per year. In other words, they take not four but eleven years to turn over their capital. But this comparison by no means shows the full strength of the Pennsylvania Railroad position. For of the 500 millions of capital, 236 millions* are represented by securities of other companies in the Pennsylvania Railroad treasury. These securities earned last year 4 1/4 per cent. on their cost and as, apart from their indirect value, they are rapidly increasing in profitability every year, they may clearly be treated as worth the price at which they stand on the Pennsylvania Railroad books. So that the real capital on which dividends have to be earned by railroad operation is not 500 but only 230 million dollars, the price at which the road and equipment stands in the company's books.† In other words, if we regard railroad capital proper, the company earns the whole of it in about a year and three-quarters.

But let us see what its railroad assets are. It owns in all by direct ownership 1,256 miles of line, but these 1,256 miles of line represent no less than 4,142 miles of track—that is, nearly 3 1/2 miles of track for every mile of route. That the road is the main highway from the whole south and west of America to the Atlantic is common knowledge; that its construction is of the most solid and modern type, with masonry viaducts, stone ballast, 100-lb. rails, etc., is plain to be seen; that the land comprises thousands of acres in the heart of the great towns of Philadelphia and Pittsburgh is equally certain; yet railroad and land stand in the company's books at, roughly, \$130,000 per mile. What they are really worth no man can say. But the engineer who puts his name to an estimate for duplicating the Pennsylvania Railroad at twice the figure would be a bold man. In fact, so long as the axiom that two bodies cannot at the same time occupy the same space remains true, a great part of it, the several railroads along the river fronts in and around Pittsburgh, for instance, or the innumerable freight terminals in the heart of Philadelphia, could not be duplicated at any price.

The other large expenditure of capital has been on equipment. This stands in the company's accounts at 62 million dollars. The equipment comprises 3,000 locomotives, 2,000 passenger cars and 63,000 freight cars. It would certainly not be excessive to value the locomotives at \$12,000 apiece, the passenger cars at \$5,000 and the freight cars at \$700. This would work out a real value of 90 million dollars against a book valuation of 62 millions. And even beyond this the company has an equitable ownership of many millions worth of cars which still remain legally the property of its car trusts, though a large part of their cost has already been paid off out of current revenues.

These figures seem to prove sufficiently that what I may call the original undertaking of the company is pretty sound financially. But what about the recent developments? Here is the situation in

broad outline. In the last seven years the company has increased its capital, stocks and bonds, by \$265,000,000. By this issue of this capital it has obtained \$300,000,000 in cash. But it has paid during this period for investments in other companies (which, as I have said, are remunerative per se) \$140,000,000; on enlargement of existing accommodation, new shops, etc., \$200,000,000. In addition it has bought millions of dollars worth of land in the heart of New York and spent many millions more on its terminal works. In other words, though only \$300,000,000 has been raised, at least \$370,000,000 has been spent. Revenue has provided not less than ten million dollars per year for capital purposes. Had it seemed good to the company to keep its account that way, it need not have charged any portion of the New York expenditure to capital, and yet it would have had another five millions of annual revenue to spare for other capital purposes. This does not look like reckless finance.

But admitting the conservativeness of the company's method of raising money, it still might be the case that the money was not well spent. Two hundred million dollars is a large sum to spend in seven years on improving an existing line. But compared to the traffic, which already reaches on the main line the phenomenal figure of over \$150,000 per mile per year and which over a series of years doubles itself every decade, it cannot be thought too large. Further, it has already resulted in enabling the company to handle its traffic properly and so not only to give a proper service to the public, but also to save millions of dollars that were being wasted in congested and therefore extravagant operation. As for New York, the company is committed to an expenditure of something like \$100,000,000. A large sum doubtless. But a good many years ago the chairman of our own Midland Railway stated that his company had spent \$45,000,000 in getting into London. New York is already nearly as big as London (3 1/2 against 4 1/2 million inhabitants) and will be bigger before many years are out. And while there is—and as far as can be seen always will be—only one company besides the Pennsylvania entering New York from the entire continent except the New England corner, there are five other companies to share with the Midland the traffic from the north of England into London. And for its twenty millions the Pennsylvania gets not only access to New York with a passenger terminus of 31 acres in the heart of the city, but secondly, the only rail connection with Brooklyn, which has a million and a quarter of inhabitants, and the whole of Long Island, and thirdly, an unapproachable convenient access from the whole south and southwest of the country to New England. The New York Central, which nowadays is admittedly an excellently managed company, is committed to an expenditure of \$70,000,000 for the electrification of its existing line and the reconstruction of its existing terminus. If it is worth while for the New York Central to spend seventy millions to remain where it is, it surely must be at least as well worth while for the Pennsylvania to spend a hundred millions to get there.

Still, a hundred millions does sound a large sum. But it must be remembered that ten millions of this have been already formally written off out of income. At least five millions more are expected to be recouped by the sale of superfluous land. Unless the company alters its habits it is safe to say that out of the profit realized by its recent sale of securities or in some other way, five or ten millions more of the cost will be written off before the work is finished. This leaves, say, \$75,000,000 as the capital cost of the New York developments. Of this more than half has already been raised and the interest on it is at present being provided out of the Pennsylvania revenue, so that all that remains to be provided is the interest on another thirty-seven and a half millions, or, say, \$1,500,000 per annum. It cannot be that the New York extension will earn no net revenue. Even on the wild supposition that this were to happen, \$1,500,000 a year would not be a very serious burden to a company which had last year \$12,000,000 over after providing for its normal 6 per cent. dividend.

It is perhaps worth while to add one more fact which a study of the accounts discloses, as it is a good instance to show how the position of the company is usually better in fact than it appears at first sight. In the general balance sheet credit is taken for the sum of \$5,789,000, in hands of the managers of a sinking fund trust created in 1878. Further examination, however, shows that this amount is merely the sum of the total payments into the fund. But during the quarter of a century of its existence the fund has naturally been growing all the time at compound interest and it now amounts not to six, but to nearly fourteen million dollars.

On the whole, I can find no reason to doubt that the position of the Pennsylvania is stronger and sounder to-day than it has ever been. The timidity of English investors has caused them in many cases to lose their fair share of the vast profits that have been made owing to the enormous appreciation in recent years of the value of a great many American investments. It is now too late to cry over the milk that has been spilt. But it will be, in my judgment, a thousand pities if English investors allow themselves to be frightened out of their holdings in a stock which has been known on the London market for fifty years and which wise and conservative management has built up year by year into an ever more and more valuable property.

*This figure of \$236,000,000 is stated in the company's report to be the "entire cost." In fact, it appears the true phrase should be "so much of the entire cost as has been charged to the capital." For where stocks have been bought for control without prospects of dividends they have been written down at the expense of income to an almost nominal figure.

†The balance of \$34,000,000 is more than covered by cash and current assets.

Convention of the American Street and Interurban Railway and Affiliated Associations.

The twenty-fifth annual convention of the American Street and Interurban Railway Association and its affiliated associations, which include the American Street and Interurban Railway Engineering Association, American Street and Interurban Railway Accountants' Association and American Street and Interurban Railway Claim Agents' Association, was held at the Ohio State Fair grounds, Columbus, Ohio, October 15 to 19, inclusive. The Engineering Association, formerly the Mechanical and Electrical Association, but now also embracing the maintenance of way department, held its fourth annual meeting on the 15th to 17th, President H. H. Adams presiding. In his address, after referring to the reorganization which has been successfully effected, and the benefits to accrue therefrom, some important features of the association's work were taken up in detail, among others the construction of buildings to minimize the fire risk. The work of the Standardization Committee was alluded to. This committee at the present time has under consideration the brake shoe, wheel tread, flange, journal, journal box and rail section. It is hoped that future work will include certain parts of the electrical equipment and motor parts such as commutators, brush-holders, brushes, gears, pinions and axle bearings. Referring to the engineers' duty to the traveling public, this was declared to be of the greatest importance, since with them lies the question of reliability of service. Nothing is more aggravating to the traveling public than interruptions to service. Explanations are not what it wants, but continuity of service.

Other addresses were delivered by E. C. Spring, President of the Central Electric Railway Association; James H. McGraw, President of the Manufacturers' Association, and W. Caryl Ely and John I. Beggs, respectively President and First Vice-President of the "American" Association.

The following papers and reports were presented at the meetings: Control Apparatus (committee report); Ties, Poles and Posts, by C. A. Alderman, Chief Engineer, Cincinnati Northern Traction Co.; Ballast, by C. H. Clark, Engineer M. of W., Cleveland Electric Ry. Co.; Maintenance and Inspection of Electrical Equipment (committee report); Standardization (committee report); Gas Engines, by Paul Windsor, Chief Engineer M. P. and R. S., Boston Elevated Ry. Co.; Underground Cables, by H. G. Stott, S. M. P. Interborough Rapid Transit Co., New York; Relative Economy of Turbines and Engines at Various Percentages of Rating, by W. Goodenough, with Stone & Webster, Boston; Economy in Car Equipment, Weights and Schedules, by E. H. Anderson, Schenectady, N. Y. Also a "Question Box" of 55 questions.

Some of the points brought out in the discussions of these subjects are of interest to our readers and will be alluded to briefly. The committee report on "Control Apparatus" noted the increased use during the year of multiple-unit control apparatus for heavy service, its use for new equipments being the rule rather than the exception. Discussion was asked regarding its application to single car units.

Mr. G. J. Smith said that the Metropolitan Street Railway of Kansas City, Mo., has had in service for three months past 30 cars, 30 ft. long, with the Type M multiple-unit control operating as single units, and from present indications the results will be so far superior to the platform controller that the management is considering the installation of this control on 120 of the same type of equipment, and doing away with the platform control. Multiple-unit control is favored because it avoids panics caused by the blowing-out of controllers operated on platforms. In Kansas City the grades are quite steep so that at times the motors take 800 amperes at 575 volts. The average amperage on the Troost avenue division is 153 amperes on 10-second readings. Such currents are too heavy to handle on the platform without danger of having not only the automatic breakers opening, but the controllers short-circuiting and causing a panic on the car.

Mr. Case, of the General Electric Co., said that below 200 h. p. the cost for multiple control is relatively higher than when it is installed in larger capacities. From an engineering standpoint he would much prefer this type of control for all cars.

Mr. Wm. Cooper (Westinghouse Co.) thought the limit of 200 h. p. a little high, not seeing any reason why there should not be as successful operation or control on smaller equipments, provided the controller is small enough to meet the conditions. The Westinghouse Company has a controller small enough to go on almost any car, with capacity of two 100 h. p. motors, or more, up to about 300 h. p. total.

Mr. Smith, of Kansas City, described a scheme used on cars there for operating the reverser mechanically. There have been five occasions when collisions or other accidents have been avoided by the action of the device.

Coming to the paper on "Ties, Poles and Posts," Prof. Richey, of Worcester, Mass., said the figures given therein were significant and indicated that the timber used will soon have to be treated to increase life, or some other material used. He said that Mr. S. H.

Kelsay, of the Indiana Union Traction Co., has proposed the use of a steel-lattice pole about 42 ft. 6 in. long to carry the trolley brackets that are used for telephone and alternating current wires, the pole being built as a three-legged tower. Such poles weigh about 500 lbs. and cost about \$20. Professor Richey thought it probable that some such construction as that will be more economical than the use of wooden poles at the rate at which the price of wooden poles is going up, and considering the relatively short life of wood as compared with such a steel tower set in concrete.

Mr. F. G. Simmons stated that in Milwaukee, on the interurban lines as well as on all other places where poles are used for lighting purposes, all poles are set in solid concrete. The concrete is brought to, or a little above, the ground line and a collar or a thread 2 or 3 in. deep and about 1 in. thick is placed around the pole where it projects above the ground, forming a channel which is filled with a paving cement of tar mixture.

Mr. Thomas Hawken, of Rockland, Me., said he had seen a pine pole that had been set in cement, which had been in use for 30 years. It was badly decayed at the top, but when cut down was found to be sound at the bottom.

Mr. Paul Windsor stated that in Boston his company is reinforcing 700 poles with ferrules spaced $\frac{1}{4}$ or $\frac{3}{8}$ in. from the pole, and filling the space with liquid concrete for strengthening the poles that have rotted out.

On the subject of "Ballast," Mr. C. A. Alderman, of Cincinnati, speaking as the representative of an interurban road, said that of late they had been inclined to the belief that concrete under ties was not the best material to use. For heavy interurban cars, weighing 70,000 lbs., and going at a high rate of speed, it was difficult to make so it would not break up, and when it broke up it disintegrated and was not much better than so much ashes under the track. He believed it very difficult to get a track laid with as little as 6 in. of concrete under the rail and have it so that it would stand the traffic of interurban cars. Several cities in Ohio had specified gravel and broken stone for ballast, and had discarded concrete. He considered there were many arguments in favor of loose ballast instead of concrete. It made a better riding track, was more easily repaired, and it did not break to pieces; it could be laid in cold weather, and if properly laid, it would answer requirements.

Mr. F. G. Simmons, Milwaukee, said he believed the efficacy of a concrete ballast was a matter of workmanship. The Milwaukee standard construction had in some cases been in nine years and had not yet required attention. A 1: $2\frac{1}{2}$: 5 mixture was used. The foundation under the concrete must be adequate.

On "Maintenance and Inspection of Electrical Equipment," Mr. Paul Windsor, Boston, said that his company had gone recently on to a mileage basis for inspection, both for surface and elevated cars. For the surface cars the night starters at the various stations kept the mileage, using the register sheets for that purpose. The fare register sheets were made up by car numbers, following a car through the various routes that it ran during the day, so that by knowing the number of trips it ran on each route and referring to a mileage table of routes, the starter could very easily make up the figures. This inspection replaced that formerly made every three days, of the brake-shoes, controllers and such things as were apt to give the first trouble. The general overhauling was also done on the mileage basis, but at much longer intervals.

Mr. Doyle, New York, stated that on the Interborough equipment the motor armature bearings were oiled every 1,000 miles, irrespective of time, and the motor axle and journal bearings were oiled every 10,000 miles. It was believed that the latter figure might be made 15,000 miles.

President Adams said his company was oiling motors once every five days, also the armature bearings; other bearings every ten days. On a mileage basis the amount of oil used and the cost of labor could be reduced.

The committee report on "Standardization" received considerable discussion. Speaking on the desirability of standardization, Mr. E. W. Olds, of Milwaukee, said that ten years ago 17 kinds of brake-shoes were in use there, though of late years it has not been necessary to order very many of them.

Mr. F. W. Sargent (Amer. B. S. & F. Co.) said that there are a number of roads, principally in the West, which are following closely steam road practice and are using the M. C. B. standard separable head and shoe.

In a communication the Central Electric Railway Association recommended the following standards:

Brake-Shoes.—The Master Car Builders' standard type of brake-shoe, brake-head and key.

Journal and Journal Boxes.—The Master Car Builders' standard so far as applicable to motor trucks for axle journals, including $3\frac{3}{4}$ in. x 7 in., $4\frac{1}{4}$ in. x 8 in., and 5 in. x 9 in. Also for these different sizes of axle journals the Master Car Builders' standard journal boxes, journal bearings and journal bearing keys.

Wheel Tread and Flange.—A wheel tread 3 in. wide with flange $\frac{3}{8}$ in. high and $1\frac{3}{16}$ in. thick at the throat for both city and interurban work.

Rails for Street and Interurban Railways.—The T section rail for both city and interurban work.

These recommendations were referred to the committee.

Mr. Olds considered the matter of wheels a pretty hard proposition. Ten years ago the Milwaukee standard was $1\frac{3}{4}$ in. x $\frac{3}{4}$ in. flange. That was supposed to be as large as could be used. The treads have grown little by little. At the present time they are using for interurban work a $2\frac{1}{2}$ in. tread with flange $\frac{13}{16}$ in. deep by $1\frac{1}{2}$ in. thick. For the city the flanges are the same dimensions except that the tread is $2\frac{1}{2}$ in. That is growing and will be larger. He hoped within the next two years to come up practically to the recommendations of the Central Association, and wishes it were possible to get at least a $3\frac{1}{2}$ in. tread. It should be possible to operate electric cars upon steam road track, and that cannot be done until practically their dimensions of wheels are adopted. In the matter of wheels themselves a great many are using cast chilled wheels; others are using steel wheels. The steel wheel without doubt has come to stay. It is to-day used almost entirely upon his interurban road and it would be a short time before it will be used entirely on city roads. It is unfortunate that it is necessary to use so heavy wheels, whether steel or cast-iron. Apparatus should be made as light as possible as it costs as much to carry around 100 lbs. of dead weight as of passengers.

In regard to standardizing motor parts Mr. E. D. Priest (G. E. Co.) said he was satisfied something could be done in this direction, though it also might easily be overdone and become a disadvantage to manufacturers and users. He suggested various lines along which it would be possible to work to advantage.

Mr. G. I. Smith, of Kansas City, wanted to know why it was not possible to put a 3-in. tread into service at once. There are practically the same conditions: Trilby rail up to 137 lbs., girder rail up to 106 lbs., and the T rail from 70 to 100 lbs. He was running 600 cars with from 3-in. to $3\frac{1}{4}$ -in. tread and found no difficulty. He put these all on within one year, and would have gone fully to $3\frac{1}{4}$ in. except that the trucks would not permit the greater weight. The saving on special work, frogs and switches made up for any extra cost in making the change.

Mr. Thos. K. Bell, of Philadelphia, said that to-day there is a necessity on the part of the street railways to get together on the question of the adoption of a suitable design of rail and insist on the rolling mills of this country getting them out. There are at the present time a number of propositions to be solved in connection with practical operation. For instance, the New York, New Haven & Hartford is figuring on trying to bring some of its M. C. B. flanges and treads right off the steam line into the city work. There is no city work to-day that will stand it, and it was only a question of a few years when the entire track structure would be destroyed by a flange going anything beyond the present depth of $\frac{7}{8}$ in.; in other words, the best rail will only allow a vertical wear of $\frac{1}{8}$ in.

Discussing Mr. Windsor's paper on "Gas Engines," Mr. Hewitt, Philadelphia, said regulation of the engine being a serious matter, it was his belief that the gas engine has been developed sufficiently well for use with direct-current generators, but he was not sure that the regulation has been obtained sufficiently close for alternating current generators, and he would like to ask if that was the case. If it was, it seemed to him that turbines are doomed.

Mr. Windsor said he was using direct current and had no trouble about the regulation. He understood that there are a good many gas engines running on alternating current and the reports to him were very favorable as to governing.

Other members testified regarding satisfactory results from gas engines with a.c. apparatus.

Following some discussion relative to first cost and operating costs compared to steam plants, Mr. Yawger (Westinghouse Co.) said it was his opinion that gas engines at the present time are to be looked on as desirable in special locations: where coal is high, costing \$3 and upwards a ton; where water is scarce; and in other conditions, like saving in copper, etc. The cost per horse-power for gas engines is bound to be much more than for steam engines unless it is learned how to make gas engines much lighter per horse-power than now.

"Economy in Car Equipment Weights and Schedules."—Mr. N. W. Storer (Westinghouse Co.) said he thought one of the greatest features in selecting motor equipments for successful operation is to get the right reduction for the motor. There have been thousands of dollars wasted and thousands of equipments given a very bad reputation simply because of the selection of a bad gear ratio. The motors may be geared for entirely too high a speed or they may be geared to too low a speed. A proper study of the conditions was not given before the gear ratio was selected. Suppose a gear ratio selected which is too high speed, 30 m.p.h. say, when service requirements are such that one only needs a maximum speed of 15 or 20 miles an hour. The motor will be run at a low voltage practically all the time. He had in mind a road where the motors were operated at an average voltage, when the power is on the motors, of about 275 volts, while the line voltage would average practically double. That means the motors have their capacity cut in two, and they are operating about half the horse-power capacity which they would

have if they were worked more on the high voltage. To get the capacity out of the motor designed for 550 volts it is necessary to use that voltage as large a part of the time as possible. That is where the high-speed gear reduction will come in. If worked at too low a reduction, that is too low a speed, the motors must be forced, the power kept up to the limit and shut off, and it will be found that in braking at the maximum speed a large part of the power in the motor is lost in the brake-shoes. This not only wears out the shoes but the coal pile at the same time. That is where the slow speed gear gets in its bad work. The lower the speed gear the easier as a general thing it is for the motor to get over the ground, and the lower the heating will be.

There is a great tendency on the part of people going into interurban work to adopt gear ratios which are really beyond the requirements. They want to reach a maximum speed of 45 or 50 m.p.h. while the track conditions may not permit the use of that excessive speed for any considerable part of the time. They sacrifice a great deal in the capacity of the motors to gain a little in the speed on a small part of the line. That is a mistake. It would not be so bad if they could get sufficient motor capacity at the same time, but they select a quadruple equipment of 75 h.p. for a 35-ton car and gear them for a very high speed, and the result is that the motors are badly overloaded.

It was stated in the paper that a great deal of trouble is experienced from the wheels of the car slipping where the weight is not all on the driving wheels. There is one point which he thought would help very materially in many cases to obviate that trouble from slipping. A great deal of trouble is due to the fact that the hand controller which is used is operated very loosely as a general thing, and the motorman may, in throwing it on, give the motors very heavy rushes of current. That will momentarily give a very high torque and start the wheels to slipping. He believed the adoption of the multiple-unit control equipment for the street cars with purely automatic acceleration will go a long way toward avoiding that trouble. There the control is practically beyond the motorman; it depends entirely on the adjustment which the controller is given before it leaves the depot.

AMERICAN ASSOCIATION.

The American Street and Interurban Railway Association, or the American Association, as it is called in contradistinction to the other organizations, convened on the 17th to 19th, President W. Cary Ely, Buffalo, N. Y., in the chair. Welcoming addresses were made by Hon. Lewis C. Laylin, Secretary of State of Ohio; Hon. Dewitt C. Badger, Mayor of Columbus; Mr. Robert Sheldon, President of the Columbus Railway and Light Company, and Mr. John Y. Bassell, Secretary of the Columbus Board of Trade. President Ely followed with his annual address. He reviewed briefly the history of the association and the conditions leading up to the reorganization effected last year. Regarding the value to the member companies of the association, the cost of reorganization, and the work done and to be done, he outlined various features which he considered evidenced the value of what had already been accomplished. Of the work to be done, none was of greater importance or could be "carried on to great advantage by this great organization than in proper ways, well revised and well calculated, to educate the people of the country to a just and thoughtful conception of the rights of corporations, not only for themselves, but as they touch the people, and also of the business conditions under which they operate. I fancy that there is not a man to-day who is well read and well informed in this business who doubts for a moment the right of the people of any community to take over in a fair way and operate the public utilities, any of them, through their municipalities or other territorial domain. As a matter of right it is undoubtedly. Then it is up to you to say to the people that as a business proposition it is unwise for the municipalities to attempt to do business which you are able to establish to the satisfaction of everybody can be done more cheaply for the people by private business interests than by municipal corporations. For years we were afraid to discuss the question. For years we said, 'Don't bring it out and talk about it in the convention,' and during all those years all the other fellows were talking about it, all the newspapers were spreading what was largely misinformation before the people, and a sentiment was forming against us that, had the people who entertained it had the just and fair means of information, might have been very different from the manifestations that have become apparent within the last few years all over the country."

Members have reason to feel much gratified over the personnel of the committees of the reorganized associations. Much thought and care had been given to the formation of these committees and it was felt that they were made up of men of signal ability and peculiar fitness for the work assigned them.

President Ely was followed by the presidents of the other associations in short addresses.

The Secretary reported a total active membership of 228 companies, and 113 associate members. There was a balance in the treasury of \$6,977.

The subjects of papers and reports were as follows: Car Wiring (committee report); Standardization of Equipment (committee

report); Promotion of Traffic (committee report); Insurance (committee report); Heavy Electric Traction (committee report); Elevated Railways and Their Bearing on Heavy Electric Traction, by H. M. Brinckerhoff, Consulting Engineer, New York; Electric Railways in Sparsely Settled Communities, by E. P. Roberts, of the Roberts & Abbott Company, Cleveland, Ohio; Interurban Freight and Express, by E. C. Spring, General Superintendent Dayton, Covington & Piqua Traction Co., West Milton, Ohio; Tickets and Rates, by F. W. Coen, Secretary Lake Shore Electric Co., Cleveland, Ohio; Some Notes on the Evolution of Electric Transportation, by Theodore Stebbins, Expert, National Civic Federation, Cohasset, Mass.; Electric Railway Employees and the Young Men's Christian Association, by E. M. Willis, Railroad Secretary International Committee Y. M. C. A., New York City; Selection of Trainmen, by Clarence E. Learned, Superintendent Inspection, Boston Elevated Ry.; Discipline of Trainmen, by F. W. Brooks, Assistant General Manager, Detroit United Railway; Uniforms and Badges, by John R. McGivney, Purchasing Agent, New Orleans Ry. and Light Co.; Municipal Ownership (committee report); Handling Public Complaints, by John A. Beeler, Vice-Pres. and Gen. Mgr. Denver City Tramway Co.; Leaks Between Passenger and Treasurer, by A. H. Stanley, Gen. Supt., Public Service Corporation of New Jersey.

Few of the foregoing subjects were discussed at all and of those that were the discussion was brief, with one or two exceptions. In the report on "Promotion of Traffic" the committee embodied its findings in a series of nine resolutions, the first of which was to the effect that the association believes that parks operated in connection with railways are profitable and desirable as a means of promoting traffic. Commenting on this, Vice-President Beggs said he did not believe, except in rare cases, in railway companies going into the matter of entertainment such as was contemplated in this resolution. He said a large amount of money had been lost by railroads going into a business they did not understand and should not be interested in at all. He believed in railroads giving assistance in some indirect manner to the promoters of these enterprises. Some of them were very profitable, but he should deplore it if the association passed the resolution in the manner in which it was set forth in the report. He thought a great many companies which years ago went into this thing lost large amounts of money. There were some railroad companies that would pay a bonus to some one who would take the parks off their hands.

The subject of "Interurban Freight and Express" brought out some points of interest. Mr. G. W. Parker, Detroit, referring to the difficulties with different municipalities relative to handling freight cars in the cities, said Detroit has an ordinance compelling payment of \$1 a round trip for all freight cars operated into and out of the city and this now cost them \$5,000 a year. Also they were not permitted to operate express cars oftener than every two hours.

Mr. Ernest Gonzenbach, Sheboygan, Wis., said he was connected with a small interurban line which up to two years ago had been doing a small amount of express and freight business using only one car, which was earning perhaps 20 cents per car per mile. Since that time they had been pushing the freight business and had succeeded to the extent that that car to-day is earning about 30 or 40 cents per mile, and in some months 45 cents, whereas their regular passenger interurban cars were earning about 25 cents per car per mile. Although they had only one car they handled very heavy shipments. They had gone into the handling of cheese. The country is a great cheese producing country and during the month of September last that one car took in \$727 gross in freight, at an operating cost of \$254, an item of operating cost which was decidedly better than could be obtained in the passenger service. On the road is a factory having an output of very heavy goods—plumbers' supplies. This factory had switching facilities from the Chicago & North-Western and was supposed to have an ironclad contract with the latter not to do business with any other road, but the facilities offered by the electric road were such that the parties undertook to get a release from the North-Western to allow them to do business with the interurban line, and while the latter was carrying the business for 3 1/4 cents per hundred, the goods were so heavy and the traffic so regular and so large that that business alone was netting about 45 cents per car per mile.

Mr. Spring, author of the paper, said Mr. Gonzenbach could not take a train of 14 cars off of a steam road and carry them to any point on his line with the present motors. Mr. Gonzenbach admitted this, but said that if he could get these results with one car, he would like very much to have 14 cars or 1,400 cars on the same basis. Mr. Spring said all would like to have them, but they would have to change their power stations to do it, and that it would be necessary to reconstruct not only the power station, but the track before freight, in its most liberal sense, could be handled.

Mr. G. B. Hippee, General Manager Interurban and Des Moines City Ry., Des Moines, Ia., said his company is handling carload freight and making an effort to get heavy carload freight in its business. He had a joint traffic arrangement with roads running to Chicago under which they would load a car of cattle and the steam road would furnish the cars, or load a car of corn, and his road got 33 1/3 per cent. of the long haul. From a 60,000 lb. load

they would get \$25 for hauling that car on an average of 15 miles. They were striving for heavy business, and had been for the last three years. Their freight earnings started at about 13 per cent., when the road first began business. The road was about completed now and freight earnings were about 40 per cent. of the gross receipts this year. They haul all the coal for the electric light station in Des Moines. This was the only road that went to the army post and they had hauled every pound of the material that had gone into the building of that post. In the last three years that represented about 8,000 cars. They have a regular freight department and had men soliciting business because there was money in long haul business—more, proportionately, than in the short haul.

Mr. Spring said there is not one road in ten equipped the same as Mr. Hippee's road to handle that kind of freight. Mr. Hippee admitted this, and added that this long haul freight did not go through the city. The company was equipped to take it around the city and make connections with the steam roads.

Mr. Brinckerhoff, New York, spoke of a discovery made on the Aurora, Elgin & Chicago, in using some Metropolitan Elevated motor cars for hauling coal, it being discovered that some of the old motor cars with very low gearing—very low speed cars—would haul five and six and even seven fully loaded coal cars. They went at a slow rate, but they would go up heavy grades successfully and very economically, so that they handle a great deal of their coal in that way and it was made profitable. If few cars could be fitted with a different gear ratio it would be found that the current consumption, that is the maximum current required in starting, would not be so large, and consequently there would not be tremendous jerks on the power stations.

He also spoke of the development of a stock-hauling traffic by some roads, hauling from the cross-roads, where the farmers brought the stock, to the steam roads, saving much driving. For a small cost a stock loading platform can be erected, the farmer is accommodated at his barnyard, and the electric road gets the haulage of the cattle to the connecting steam road. He inquired whether the steam roads objected to that; whether it was not possible to work in harmony with them to develop a business along that line; not to compete with them, but to feed the business to them which the electric roads gather at the cross-roads.

Mr. Spring said that is a matter which the interurban roads of Ohio and Indiana had been trying to arrange in some amicable way with the steam roads. At the present time the steam roads did not recognize any comity at all with the electric roads. An arrangement could be made with the steam roads to interchange carload lots. The electric roads could work up a certain amount of business which could be turned over to the steam roads, which would be profitable to both, but it had been impossible up to the present time to get them to recognize or work together in any way or manner.

In the discussion of the paper on "Leaks Between Passenger and Treasurer," reference was made to the "pay-as-you-enter" cars of Montreal, one of which was exhibited at the convention. There are 50 of these cars in use in Montreal, and 100 more are to go into service shortly. It was explained by Mr. W. G. Ross, of Montreal, that the advantage to the public is, that once passengers are inside the car they are not troubled in any way. There are two separate exits, and they can leave the car without any interruption from the incoming passengers. Nor is the conductor going through the car every time a passenger boards it, which is considered a particularly good point, especially during the time when the cars are very crowded, for then the conductor, in moving through the car, pushes against the passengers, which is very objectionable. This car keeps the conductor where he ought to be to look after his business—on the rear platform.

Asked what method was pursued in issuing transfers to the passengers on such cars, Mr. Ross said that the conductor issued the transfers at the time the passenger entered the car.

Mr. Beggs thought that this might have a tendency to choke the entrance of the car and delay the car very greatly when the conductor is busy delivering to passengers a large number of transfers to different points. Nearly all roads in the different parts of the country have found it necessary in order to reduce the abuse of transfers, to require them to be demanded immediately upon the payment of fares, and in Milwaukee, unless they are so demanded, the transfer is not issued. It seemed to him that a mass of people crowding on the car might block up the passageway under such circumstances.

In answer to this it was explained that the platform was sufficiently large to accommodate about 40 passengers, although they might be a little crowded. In exceptional cases, the maximum cases, 35 or 40 will be the limit of any picking up at a transfer corner. "The pay-as-you-enter car is not a pay-before-you-enter car. The rear platform is very large and has been made the pay office. When there are 35 or 40 passengers to deal with the pay office is sufficient to accommodate them, and while these 35 or 40 are getting on, 10 or 15 of them will already have paid and passed through, leaving 25 or 30 to be attended to. The conductors carry four different kinds of tickets and must furnish tickets of any of the series to passengers who request them, and issue transfers at the same time; but the

issuing of transfers and the giving of change and tickets is done while the car is under way, those not having paid remaining on the platform.

The election of officers of the American Association for the ensuing year resulted as follows: President, John I. Beggs, Milwaukee, Wis.; First Vice-President, Calvin G. Goodrich, Minneapolis, Minn.; Second Vice-President, James F. Shaw, Boston, Mass.; Third Vice-President, Arthur W. Brady, Anderson, Ind. Members Executive Committee in addition to the officers are: C. L. S. Tingley, Philadelphia (President Accountants' Association); H. H. Adams, Baltimore (President Engineering Association); S. L. Rhoades, Philadelphia (President Claim Agents' Association).

OTHER ASSOCIATIONS.

The Claim Agents' Association held its meetings on the first two days of the week, President S. L. Rhoades, Philadelphia, in the chair. The subjects considered were: Which Is the Better Policy, Quick or Delayed Settlements? by A. J. Farrell, Claim Agent International Ry. Co., Buffalo, N. Y.; The Policy of the Claim Department Toward the Public, by F. W. Weh, Claim Agent Cleveland Electric Ry. Co., Cleveland, Ohio; The Claim Agent's Work of the Future, by C. W. Hare, United Gas Improvement Co., Philadelphia; The Relation of Statistical Bureaus to the Claim Agent's Work, by W. De M. Hooper; Methods of Management of Claim Departments, by H. C. Bradley, Adjuster Chicago Union Traction Co.; also a "Question Box" of 24 questions.

The Accountants' Association met on Tuesday and Wednesday forenoons—the latter being in joint session with the American Association—and on Thursday forenoon and afternoon. Papers were presented on: The Accounting of Capital Expenditures, by P. S. Young, Comptroller Public Service Corporation of New Jersey; The Use of Curves in Statistics, by A. Stuart Pratt, General Auditor and Treasurer Stone & Webster, Boston, Mass.; Depreciation as Applicable to Electric Railways, by R. N. Wallis, Treasurer Fitchburg & Leominster Street Ry., Fitchburg, Mass. Also there was a "Question Box" of 19 questions.

Train Accidents in the United States in September.¹

xc, 3d, Illinois Central, Clarksville, Tenn., a collision between a freight train and a work train; three employees injured.

unx, 3d, South & Western, Huntdale, N. C., a mixed train was derailed and two freight cars and one baggage car were wrecked. Five trainmen were injured.

bc, 4th, 10 p.m., Pere Marquette, Clary, Mich., northbound train No. 5, about to enter a side track, was run into by southbound passenger train No. 10, badly damaging both engines and one baggage car. Seven passengers, three trainmen and two tramps were injured. It is said that No. 10 was seven minutes ahead of time. There was a dense fog.

bc, 5th, Baltimore & Ohio, Sir John's Run, Md., butting collision of freight trains, making a bad wreck which blocked both main tracks, and which was run into a moment afterwards by a freight train on the adjacent track. One trainman was killed and two were injured.

bc, 5th, Louisville & Nashville, Middlesboro, Ky., butting collision between freight trains, due, it is said, to the failure of an operator to deliver an order to one of the trains. One engineman was injured.

unx, 5th, 9 p.m., Atchison, Topeka & Santa Fe, Houck, Ariz., passenger train No. 4 was derailed and several cars were overturned. Three passengers were injured.

dn, 6th, Western Maryland, Keyser, W. Va., a freight train was derailed at a misplaced switch; engineman and fireman injured, the former fatally.

dn, 7th, Northern Alabama, Calumet, Ala., freight train No. 4 was derailed at an unfastened switch; engineman and fireman injured.

dn, 7th, Southern Railway, Claremont, Va., a freight train descending a steep grade became uncontrollable and was derailed and wrecked at a switch. One man was injured.

unf, 7th, 8 p.m., Southern, Brompton, Ala., passenger train No. 36 was derailed by a push car loaded with sleepers, which had been accidentally or maliciously left standing on the main track. All

of the cars except one were ditched. The engineman was killed and the fireman was injured.

unx, 7th, Erie road, Greenwood Lake, N. J., a car in a freight train was derailed and one employee was fatally injured.

bc, 8th, Baltimore & Ohio, Woodland, W. Va., butting collision of passenger trains, on a bridge over Fish creek, damaging both engines. Both firemen were killed and one engineman and one other man were fatally injured. There was a dense fog at the time.

eq, 8th, Chicago, Milwaukee & St. Paul, Chula, Mo., a freight train was derailed by a broken journal and ten cars were ditched. A brakeman was killed.

unx, 8th, Cleveland, Cincinnati, Chicago & St. Louis, Norris City, Ill., a freight train drawn by two engines was derailed at a switch; one engineman killed and one fireman injured.

rc, 9th, Union Pacific, Manila, Colo., rear collision of freight trains; three passengers riding in the caboose of the leading train injured.

unf, 9th, 4 a.m., St. Louis, Iron Mountain & Southern, Gallion, La., southbound passenger train No. 103 was derailed at a switch which had been maliciously misplaced or loosened, and the engine was wrecked. The engineman was killed and the fireman, baggage-man and mail clerk were injured.

eq, 10th, Southern Pacific, Sea Cliff, Cal., a passenger train was derailed by a breakage in some part of the locomotive, and the first five cars fell down a bank. Twenty-seven persons were injured, two of them fatally.

unx, 10th, Wisconsin Central, Waupaca, Wis., a freight train was derailed, making a bad wreck; engineman and fireman killed and seven other men seriously scalded.

†10th, Atchison, Topeka & Santa Fe, Kingsley, Kan., a westbound passenger train was derailed; one passenger killed, seven injured.

bc, 12th, 2 a.m., Western & Atlantic, Ringgold, Ga., butting collision of freight trains, both running at full speed; both engines and many cars were wrecked. Seven trainmen were killed. It is said that the northbound train was running in violation of a meeting order which had been delivered to it.

bc, 12th, Louisville & Nashville, Ivalee, Ala., butting collision of freight trains, both running at full speed. Both engines and many cars were wrecked. One engineman and one fireman were killed and three other trainmen were injured.

xc, 13th, Oregon Railroad & Navigation, Durkee, Ore., a freight train which escaped control ran at high speed down grade eastward and collided with westbound passenger train No. 1, wrecking the engine of the freight and the engine of the passenger, and badly damaging 15 cars of the freight train. The fireman of the freight was injured by jumping and several passengers were slightly injured. The engineman of the passenger train had seen the approaching freight and had stopped and was moving backward slowly when the collision occurred.

eq, 13th, Midland Valley, Big Heart, Ind. T., a passenger train was derailed by the breaking of a spring of one of the trucks of the rear passenger car; five passengers injured.

†xc, 16th, Piqua, Ohio, a freight train of the Pittsburgh, Cincinnati, Chicago & St. Louis ran into an excursion passenger train of the Cincinnati, Hamilton & Dayton, wrecking both engines and several cars. One passenger was killed and several others were injured.

unx, 17th, New Orleans & Northwestern, Cypress City, La., a gravel train was derailed and wrecked and one brakeman was killed.

o, 17th, Pennsylvania road, Monongahela City, Pa., the locomotive of a freight train was wrecked by the explosion of its boiler; the engineman and fireman were killed and four other employees were injured.

unf, 18th, St. Louis & San Francisco, Carleton, Okla., a freight train broke through a bridge which had been weakened by a flood and the engine and five cars fell into Canadian river. The engineman and fireman were killed.

xc, 18th, Baltimore & Ohio Southwestern, Huron, Ind., a local passenger train backing into a side track was run into by an express passenger train running in the same direction, and the engineman and fireman of the express were killed. One passenger and three mail clerks were injured.

†unf, 18th, 8.30 a.m., Chicago, Rock Island & Pacific, Dover, Okla., northbound passenger train No. 12 broke through the bridge over Cimarron river. The engine was completely submerged and the first two passenger cars were nearly so, the passengers in them being rescued. The river had been swollen by heavy rains, and the current had weakened some of the supports of the bridge, so that the defect was not apparent to the engineman. The number of passengers was about 60. Seventeen passengers were slightly injured, two trainmen were slightly injured, a mail clerk was drowned and one child died from exposure. A representative of the road gave the following account of the accident: "The train reached the Cimarron at 8.30. Enginier Iles and Fireman Bryan, seeing the unsafe condition of the bridge, jumped, after the engineer had turned on the air-brakes. The engine and tender dis-

¹Accidents in which injuries are few or slight and the money loss is apparently small, will, as a rule, be omitted from this list. The official accident record, published by the Interstate Commerce Commission quarterly, is regularly reprinted in the *Railroad Gazette*. The classification of the accidents in the present list is indicated by the use of the following

ABBREVIATIONS.

rc	Rear collisions.
bc	Butting collisions.
xc	Miscellaneous collisions.
dr	Derailments; defects of roadway.
eq	Derailments; defects of equipment.
dn	Derailments; negligence in operating.
unf	Derailments; unforeseen obstruction.
unx	Derailments; unexplained.
-o	Miscellaneous accidents.

An asterisk at the beginning of a paragraph indicates a wreck wholly or partly destroyed by fire; a dagger indicates an accident causing the death of one or more passengers.

peared and have not been seen since. The momentum of the train and the swiftness of the current was such that the cars did not pile up but shot off downstream when they hit the water, thus averting a terrible disaster. The mail and baggage cars soon lodged. The smoking car, from which ten persons escaped with slight injury, made for the middle of the stream more gradually and lodged about 600 ft. from the bridge, where it is still under water. The stream is about 800 ft. wide. In the day coach there were about 50 people, many being women and children. Had it followed the smoker half of the people in this car would have been drowned. Instead as the momentum was less it was carried more by the current and described a semi-circle, stopping near the south bank of the river. Many people in the car were nearly drowned when taken out, but soon revived. A number received injuries, being cut with glass and bruised. The two Pullmans and the chair car remained on the track. Many persons have been taken from driftwood in the stream below the wreck, and all who were not in the smoker have been accounted for." The bridge was 900 ft. long, and after the accident, by the further rise of the river, it was entirely swept away. There was no rain in the vicinity of the bridge and nothing to indicate to the engineman that a flood had come down from above. A southbound train passed over two hours earlier, at which time the river bed had its usual dry appearance, with sand bars the prominent feature. It is thought that a highway bridge which had broken loose above caused the sudden carrying away of the railroad bridge.

rc, 19th, Chicago, Indianapolis & Louisville, Bainbridge, Ind., a freight train ran into the rear of a preceding gravel train and 15 gravel cars and a caboose were wrecked. The fireman was killed. It is said that the gravel train had been delayed by breaking in two and that the flagman sent back to stop the freight train sat down and fell asleep.

*xc, 19th, Chicago & North-Western, Pulaski, Wis., a work train collided with a boarding car, wrecking the two cars. The wreck took fire and was partly burnt up. Two employees were killed and 11 were injured, some of them fatally.

*trc, 20th, Great Northern, Cut Bank, Mont., rear collision of freight trains, wrecking two freight cars and the caboose. The wreck took fire and was partly burnt up. Two drovers and two employees were killed.

bc, 20th, 11 p.m., Cincinnati, Hamilton & Dayton, Dayton, Ohio, collision between a southbound special passenger train and a northbound freight; one engineman killed, one fireman fatally injured. It is said that the passenger engineman was deceived by the absence of a headlight on the freight engine.

xc, 21st, Lake Erie & Western, Clemens, Ill., collision of freight trains; one engine overturned; one brakeman and the engineman injured, the former fatally.

21st, Chicago, Rock Island & Pacific, Forest City, Ark., passenger train No. 3 was derailed at a switch and one sleeping car was overturned. The conductor was fatally injured.

bc, 23d, Cincinnati & Muskingum Valley, Rock Cut, Ohio, collision between a freight train and a work train, due to a misunderstanding between the conductor of the work train and his engineman; three employees killed, nine injured.

unx, 23d, Texas & Pacific, Texarkana, Ark., freight train No. 19 was derailed and ten cars were wrecked. A trespasser riding in one of the cars was killed.

o, 23d, St. Louis, Iron Mountain & Southern, Ferriday, La., the locomotive of a freight train was wrecked by the explosion of its boiler and seven persons were injured, two of them fatally.

*24th, Minneapolis & St. Louis, New Prague, Minn., a southbound passenger train collided with a freight train switching on

the main track. Four passengers and one trainman were killed and several passengers were injured.

†*xc, 26th, 5.10 a.m., Wabash road, Catlin, Ill., passenger train No. 8 ran over a misplaced switch and into a freight train standing on the side track, making a bad wreck. Four passengers, two trainmen and three other persons were killed, and 36 passengers, eight employees and two other persons were injured. The wreck took fire from the engine and five cars were burnt up.

unf, 27th, 3 a.m., Southern Railway, Allendale, S. C., passenger train No. 30 was derailed on a trestle bridge and the engineman and fireman were injured, the latter fatally. The fireman, before his death, asserted that a rail had been removed from the track. The cars were all overturned, but the passengers escaped without serious injury.

unf, 27th, Louisville & Nashville, Monroe, Ala., a passenger train was derailed at a washout and the engine was overturned. Three trainmen were injured.

unf, 28th, Mississippi Central, Brookhaven, Miss., the engine of a special train, consisting of an engine and caboose, was derailed at a washout and five trainmen on the tender were injured. The caboose was filled with passengers who had been taken from a disabled train, but all escaped without serious injury.

28th, St. Louis & San Francisco, Bushy Head, Ind. T., a freight train was derailed and eight cars were wrecked, in consequence of the overturning of a car on which was a steam shovel.

†rc, 29th, Pennsylvania road, Eddington, Pa., a westbound passenger train which had been unexpectedly stopped was run into at the rear by a following passenger train and the two rear cars of the standing train were wrecked. Three passengers were killed and 20 or more were injured. The moving train was running at uncontrollable speed in consequence of insufficient brake power. The angle cock on the front end of the fourth car had been accidentally closed, thus putting three of the six cars of the train out of the control of the engineman. Facts concerning this collision were given in the *Railroad Gazette* of October 19 and in the editorial column of this issue. The coroner's jury in its verdict said: "We believe that such collision occurred from causes unknown to and beyond the foresight or control of the employees or officers of said railroad company, and therefore release them from all responsibility for said accident."

dn, 29th, 7.40 p.m., Louisville & Nashville, Clarksville, Tenn., a northbound passenger train was derailed at an open draw and the engine and first two cars fell into the Cumberland river. Six trainmen went down in the wreck; four were rescued and two were killed.

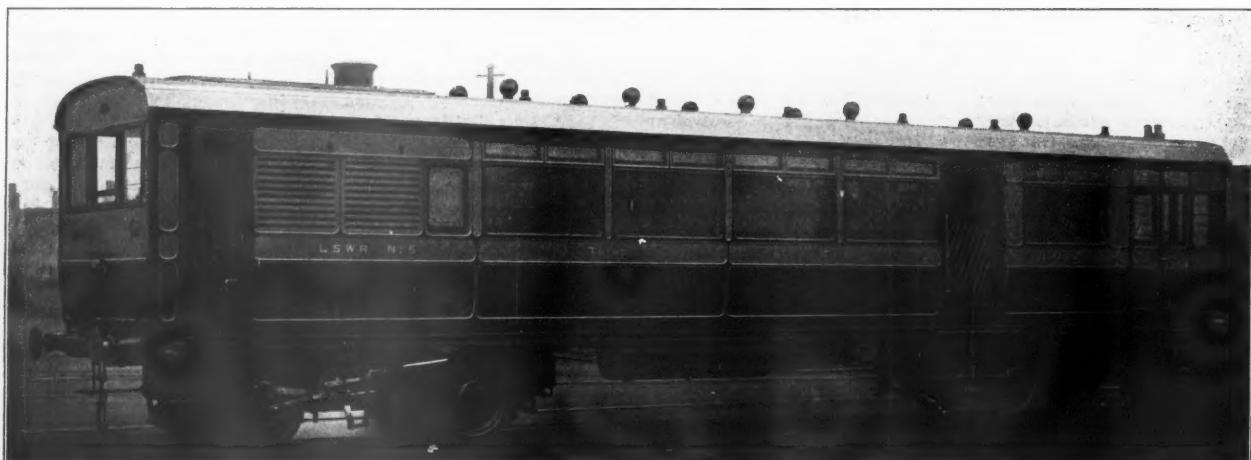
*xc, 30th, St. Louis & San Francisco, Carthage, Mo., collision of freight trains, wrecking several cars. The wreck caught fire and was mostly burnt up. Three trainmen were killed.

Steam Motor Car for the London & South Western.

The accompanying illustration shows a steam motor car in use on the London & South Western. It is driven by an engine mounted on the truck at one end and is divided into compartments for first and third class passengers, for which side entrances are provided. The engine is fitted with the Walschaert valve gear, and drives the end pair of wheels of the motor truck only, the trailing wheels not being coupled. The motor truck is built with inside frames and outside cylinders, and the rear truck has the same arrangement of frames.

The general dimensions of the engine are:

Cylinders, diameter	10 in.
Piston stroke	14 in.
Diameter of wheels	36 in.
Steam pressure	175 lbs.
Total heating surface	347 sq. ft.
Grate area	6.75 sq. ft.
Total weight of car in working order	72,352 lbs.



Steam Rail Motor Car; London & South Western.

Ship Building on the Great Lakes.

BY RALPH D. WILLIAMS,
Editor of the Marine Review.

At the beginning of 1906, the ship builders of the great lakes had under order 39 vessels for this year's delivery, of which 34 were bulk freighters, two package freighters, two car ferries and one a passenger steamer. Many of these boats had been ordered early in the preceding summer, a thing unprecedented in the history of the great lakes, as new vessels are usually not contracted for until late in the fall, when the volume of the next year's commerce can be more accurately gaged. With the exception of two 6,500-ton freighters, the 34 bulk (ore) freighters ordered had carrying capacities ranging from 8,000 to 12,000 tons, and a total carrying capacity of 338,000 tons. These 34 boats are capable of moving in a season approximately 6,760,000 tons of ore. The average carrying capacity of the modern lake freighter has grown so fast that it is now almost double what it was as late as three years ago. During the preceding year, 1905, there had been put into the water on the great lakes 28 steamers. All of the steamers ordered for 1906 delivery are now in commission.

The following table gives the names, dimensions, capacities and ownership of the new boats, and shows the company by which they were built. It will be observed from this table that the Pittsburgh Steamship Co., which is the lake line of the United States Steel Corporation, the Cambria Steel Co., the Jones & Laughlin Steel Co. and the Cleveland Cliffs Iron Co., are among the heaviest builders of ships. These are all owners and consumers of iron ore and their orders represent the strong tendency of steel companies to control their own avenues of transportation.

Five of the new steamers are shown in the accompanying photographs. Of these the "Harry Coulby," a bulk freighter of 10,000 tons, was built at the Wyndotte yard, and the "Henry B. Smith," also of 10,000 tons, at the Lorain yard of the American Shipbuilding Company. The "William P. Snyder," of 10,000 tons, was built at the Ecorse yard, Detroit, of the Great Lakes Engineering Works. The other two vessels are each 12,000-ton boats, the largest on the lakes. The "Henry H. Rogers" is one of four sister ships built by the American Shipbuilding Co. during the year for the Pittsburgh Steamship Co. (United States Steel Corporation), the other three being the "J. Pierpont Morgan," "Norman B. Ream" and "Peter A. B. Widener." They are 600 ft. over all, 580 ft. keel, 58 ft. beam and 32 ft. deep. With a load of 12,000 tons they draw 19 ft. When drawing 21 ft. they have actually carried 14,000 tons. This loading can be obtained on the exclusively Lake Michigan run from Escanaba to South Chicago, carrying ore for the Chicago plants of the Steel Corporation. The other 12,000-ton bulk freighter shown, the "Edward Y. Townsend," with the sister ship, "Daniel J. Morrell," was built by the American Shipbuilding Co. for the Cambria Steel Co. of Philadelphia, and is by a margin of two feet in length at present the largest freight boat on the lakes, being 602 ft. over all and 582 ft. keel. The extra two feet, however, is taken up in the forepeak and does not represent cargo space. In 1907 there are to be three 605-ft. steamers built.

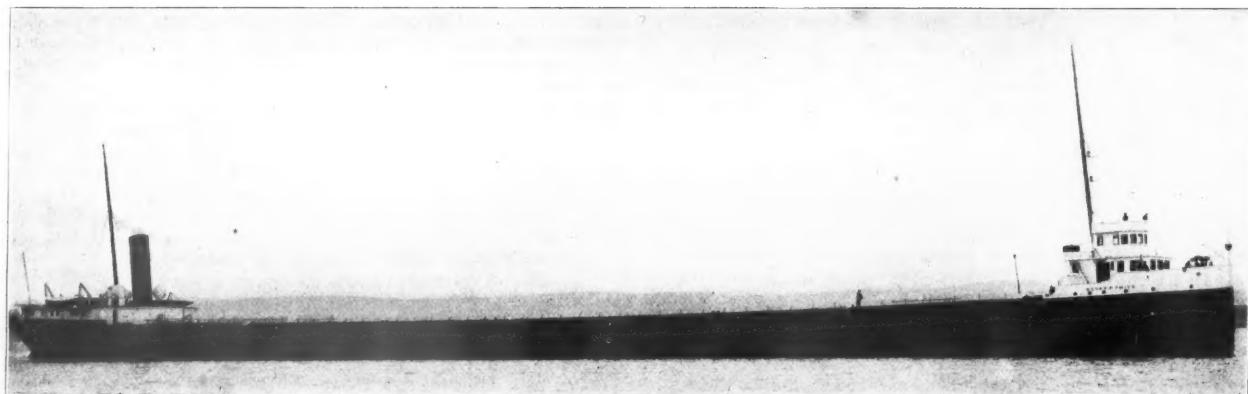
The practice of ordering well in advance of delivery has been continued this year. In fact, in the spring of 1906 orders began to

be placed for 1907 delivery. To-day there are under order for 1907 delivery 36 vessels, of which 34 are bulk freighters, one a passenger steamer and one a car ferry. These probably do not represent the extent of next year's building, for additional contracts are pending and expected in the near future. Of these 22 will be built by the American Ship Building Co., nine by the Great Lakes Engineering Works, three by the Toledo Ship Building Co., Toledo, and two by the Collingwood Ship Building Co., Collingwood, Ont. These 34 bulk freighters range from 5,500 to 12,000 gross tons capacity, one being 5,500 tons, three 6,500 tons, six 7,000 tons, one 7,500 tons, two 8,000 tons, three 9,000 tons, ten 10,000 tons, one 11,000 tons, and seven 12,000 tons. The tendency toward large ships is therefore very marked. The ships for 1907 delivery are as follows:

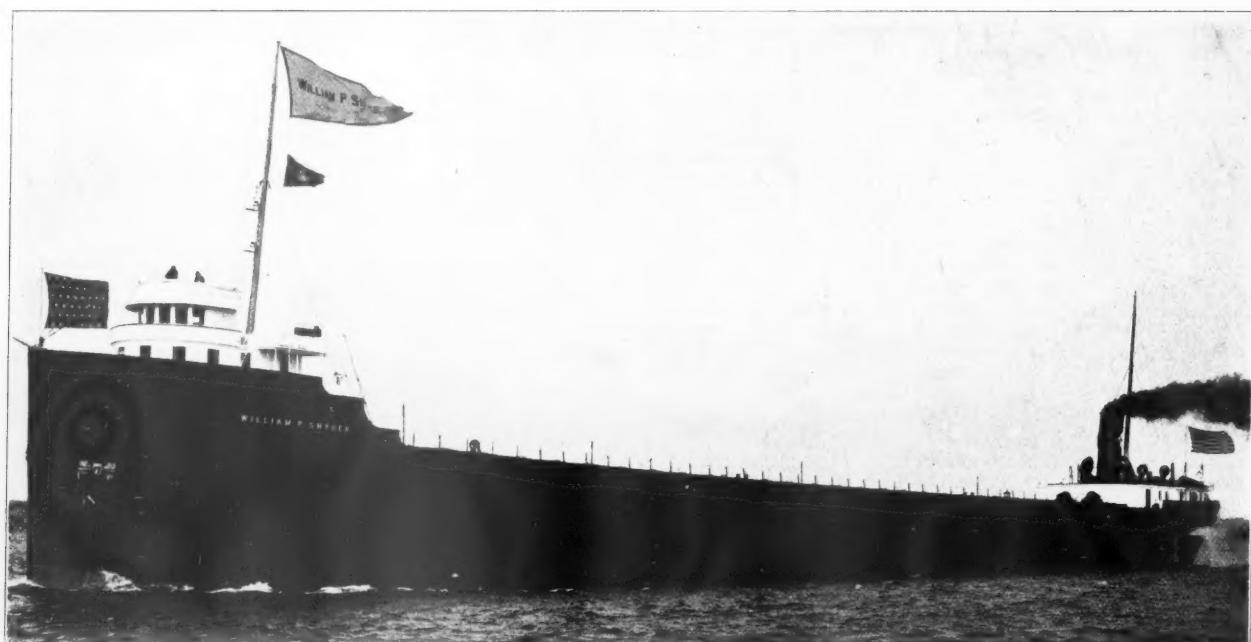
Type.	American Ship Building Company.			
	Over all.	Dimensions in ft.	Carry'g capacity.	For whom building.
Car ferry	270	259 52 19	....	Ann Arbor Railway.
Freight'r	440	420 52 18	6,500	Dennis Sullivan, Chicago.
Freight'r	440	420 52 18	6,500	Dennis Sullivan, Chicago.
"	605	585 60 32	12,000	Weston Transit Co., N. Tonawanda.
"	605	585 60 32	12,000	Weston Transit Co., N. Tonawanda.
"	605	585 60 32	12,000	Weston Transit Co., N. Tonawanda.
"	552	532 56 31	10,000	C. L. Hutchinson, Cleveland.
"	552	532 56 31	10,000	John Mitchell, Cleveland.
"	552	532 56 31	10,000	H. Steinbrenner, Cleveland.
"	440	420 52 28	6,500	Joseph Sellwood, Duluth.
"	540	520 54 31	10,000	J. C. Gilchrist, Cleveland.
"	540	520 54 31	10,000	J. C. Gilchrist, Cleveland.
"	552	532 56 31	10,000	W. A. & A. H. Hawgood, Cleveland.
"	440	420 52 28	7,000	Lackawanna Steamship Co.
"	440	420 52 28	7,000	Lackawanna Steamship Co.
"	440	420 52 28	7,000	Lackawanna Steamship Co.
"	440	420 52 28	7,000	Lackawanna Steamship Co.
"	500	480 52 30	8,000	Lackawanna Steamship Co.
"	500	480 52 30	8,000	Lackawanna Steamship Co.
"	500	480 52 30	8,000	Lackawanna Steamship Co.
"	440	420 54 28	7,500	W. H. Becker, Cleveland.
"	524	504 54 30	9,000	S. P. Cranage, Bay City.
"	524	504 54 30	9,000	E. D. Carter, Erie, Pa.
Pass. str.	402	390 54 22	....	Detroit & Clev. Nav. Co., Detroit.
Freight'r	600	580 58 32	12,000	Pittsburg S.S. Co., Cleveland.
"	600	580 58 32	12,000	Pittsburg S.S. Co., Cleveland.
"	600	580 58 32	12,000	Pittsburg S.S. Co., Cleveland.
"	524	504 54 30	9,000	C. O. Jenkins, Cleveland.
"	552	532 58 31	10,000	Pickards, Mather & Co., Cleveland.
"	552	532 56 30	10,000	Acme S. S. Co., Duluth.
"	552	532 56 31	10,000	W. A. & A. H. Hawgood, Cleveland.
Great Lakes Engineering Works.				
Freight'r	440	420 52 28	7,000	C. W. Elphicke, Chicago.
"	440	420 52 28	7,000	Pennsylvania Companies.
"	440	420 52 28	7,000	Dearborn (Mich.) Transit Co.
"	600	580 58 32	12,000	Pittsburg S.S. Co., Cleveland.
"	574	554 58 32	11,000	Wm. P. Snyder, Pittsburgh.
"	552	532 58 31	10,000	Pickards, Mather & Co., Cleveland.
"	524	504 54 30	9,000	Jas. E. Davidson and H. L. Shaw, Bay City.
"	500	480 54 30	8,000	.....
"	500	480 54 30	8,000	.....
Collingwood Ship Building Company.				
"	400	380 50 28	5,500	Farrar Transp. Co., Collingwood.
"	486	466 55 30	7,500	Midland (Ont.) Nav. Co.
Toledo Ship Building Company.				
"	458	438 52 28	7,000	G. A. Tomlinson, Duluth.
"	460	440 53 29	7,000	Smith & Wilkinson, Syracuse.
"	460	440 53 29	7,000	Smith & Wilkinson, Syracuse.

As in the 1906 list, the steel companies are prominent. Four of these steamers are for the Pittsburgh Steamship Co., and three

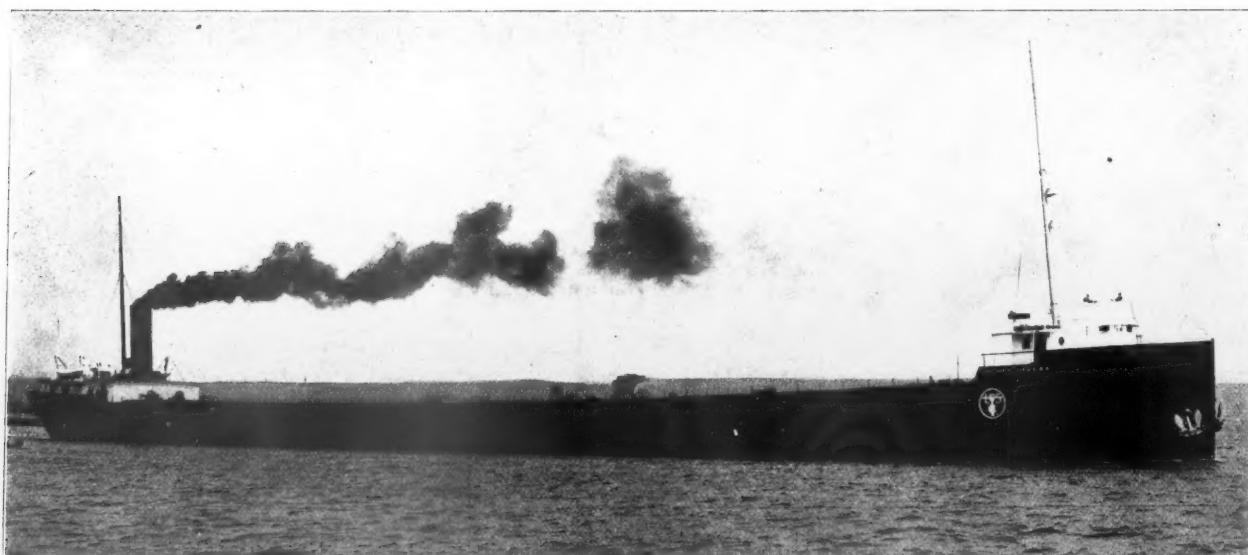
Name.	Type.	American Ship Building Company.				For whom building.
		Over all.	Dimensions in ft.	Carry'g capacity.		
Marquette & Bessemer No. 2..	Car ferry.	350	338 54 19 1/2	....	Marquette & Bessemer Dock & Nav. Co., Conneaut.	
Charles S. Hebard	Freighter.	524	504 54 30	9,000	Wilson Transit Co., Cleveland.	
Joseph Cudwy	"	545	525 53 31	10,000	Captain John Mitchell, Cleveland.	
Loftus Cudwy	"	545	525 53 31	10,000	Captain John Mitchell, Cleveland.	
James B. Wood	"	524	514 54 31	9,500	Gilchrist Transportation Co., Cleveland.	
John Sherwin	"	534	514 54 31	9,500	Gilchrist Transportation Co., Cleveland.	
W. K. Bixby	"	500	480 52 30	8,000	Hugh McMillan, Detroit.	
E. D. Carter	"	524	504 54 30	9,000	E. D. Carter, Erie, Pa.	
D. Z. Norton	"	500	480 52 30	9,000	W. C. Richardson, Cleveland.	
H. D. Goulder	"	545	525 55 31	10,000	W. A. Hawgood, Cleveland.	
Abraham Stearn	"	545	525 55 31	10,000	W. A. Hawgood, Cleveland.	
E. J. Earling	"	545	525 55 31	10,000	H. H. Orkes, Detroit.	
Harry Coulby	"	569	549 56 31	11,000	H. S. Wilkinson, Syracuse.	
Charles A. Weston	"	569	549 56 31	11,000	W. M. Mills, Tonawanda, N. Y.	
J. Pierpont Morgan	"	600	580 58 32	12,000	Pittsburg Steamship Co., Cleveland.	
H. H. Rogers	"	600	580 58 32	12,000	Pittsburg Steamship Co., Cleveland.	
H. A. Hawgood	"	545	525 55 31	10,000	Henry Hawgood, Cleveland.	
J. Q. Riddle	"	545	525 55 31	10,000	Rutland Transit Co., Ogdensburg.	
Ogdensburg	Package freighter.	256	242 43 26.6	3,000	Rutland Transit Co., Ogdensburg.	
Rutland	Package freighter.	256	242 43 26.6	3,000	Rutland Transit Co., Ogdensburg.	
W. G. Pollock	Freighter.	440	420 52 28	6,500	W. H. Becker, Cleveland.	
Samuel Mather	"	550	530 60 31	10,000	Pickards, Mather & Co., Cleveland.	
Norman B. Ream	"	600	580 58 32	12,000	Pittsburg Steamship Co., Cleveland.	
Peter A. B. Widener	"	600	580 58 32	12,000	Pittsburg Steamship Co., Cleveland.	
Joshua Rhoades	"	440	420 52 28	6,500	W. H. Becker, Cleveland.	
Daniel J. Morrell	"	602	582 58 32	12,000	Cambria Steel Co., Philadelphia.	
Edward Y. Townsend	"	602	582 58 32	12,000	Cambria Steel Co., Philadelphia.	
H. B. Smith	"	552	532 56 31	10,000	W. A. & A. H. Hawgood, Cleveland.	
Sir Thomas Shaughnessy	"	500	480 52 30	8,000	C. O. Jenkins, Cleveland.	
Great Lakes Engineering Works.						
Frank C. Ball	Freighter.	550	530 56 31	10,000	Globe Steamship Co., Duluth.	
James Laughlin	"	550	530 56 31	10,000	Jones & Laughlin Steel Co., Pittsburgh.	
B. F. Jones	"	550	530 56 31	10,000	Jones & Laughlin Steel Co., Pittsburgh.	
W. P. Snyder	"	550	530 56 31	10,000	Shenango Steamship Co., Cleveland.	
Michigan	"	350	330 56 31	10,000	Cleveland Cliffs Iron Co., Cleveland.	
Ishpeming	"	550	530 56 31	10,000	Cleveland Cliffs Iron Co., Cleveland.	
J. H. Sheadle	"	550	530 56 31	10,000	Cleveland Cliffs Iron Co., Cleveland.	
Ashtabula	Car ferry.	350	330 56 20	30 cars.	James W. Ellsworth & Co., Cleveland.	
Toledo Ship Building Company.						
Eugene Zimmerman	Freighter.	500	480 52 30	8,000	L. S. Sullivan, Toledo.	
Theodore Roosevelt	Pass'ger steamer.	289	270 40 16	....	Indiana Transportation Co., Michigan City, Ind.	



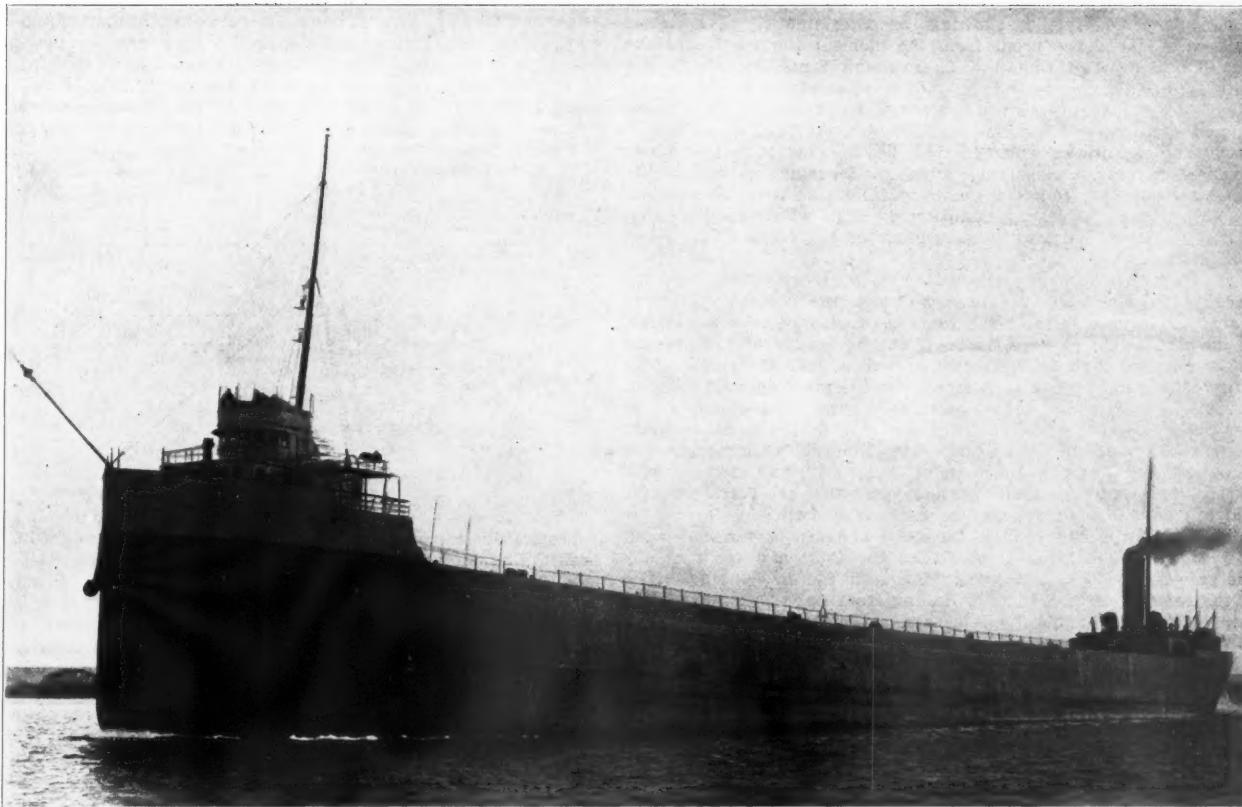
Ten Thousand Ton Freighter "Henry B. Smith."



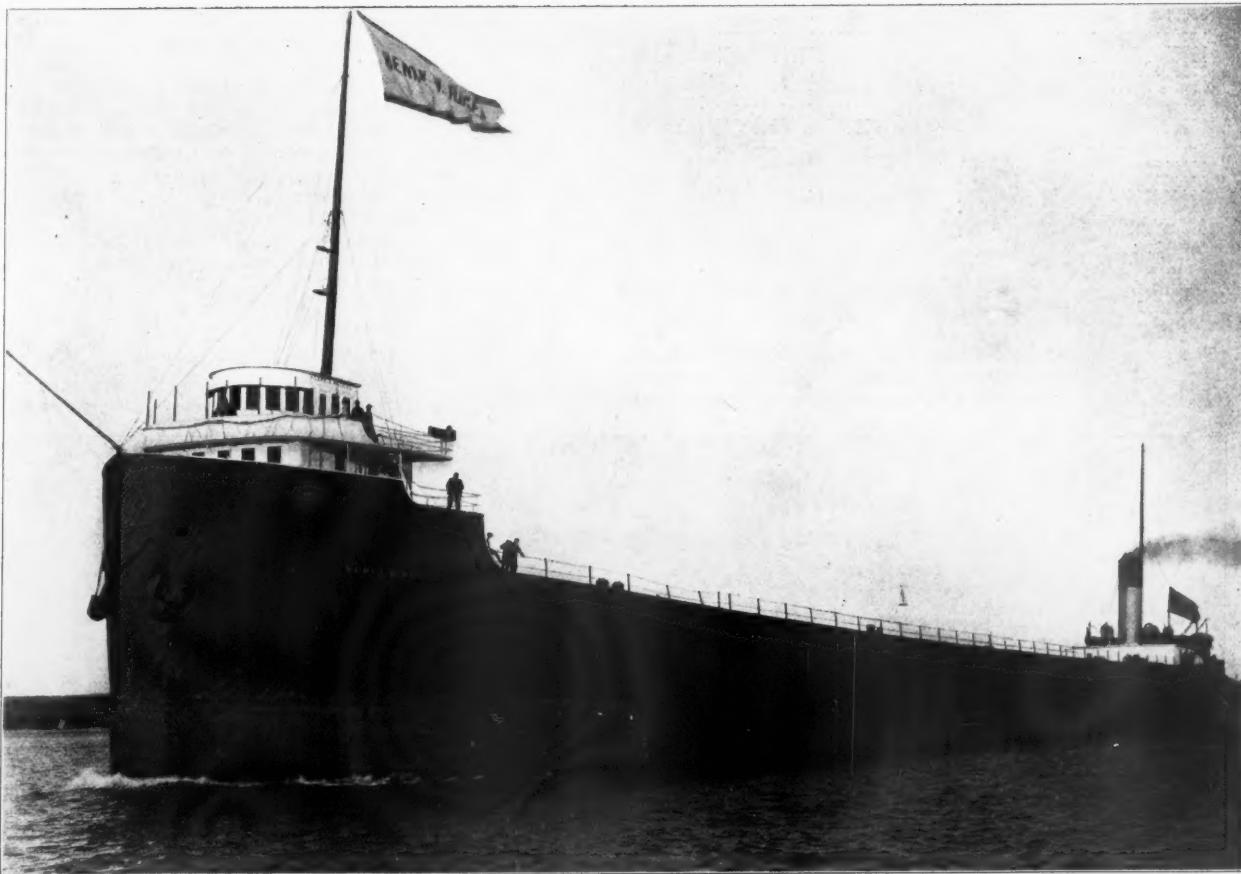
Ten Thousand Ton Freighter "William P. Snyder"; Shenango Steamship Company.



Eleven Thousand Ton Freighter "Harry Coulby."



Twelve Thousand Ton Freighter "Edward Y. Townsend"; Cambria Steel Company.



Twelve Thousand Ton Freighter "Henry H. Rogers"; United States Steel Corporation.

for the Weston Transit Co., which is controlled by the Tonawanda Iron & Steel Co., further showing the determination of the steel companies to make a profit from the moment the ore leaves the ground. More than this, the Lackawanna Steel Co., which has built at Buffalo the largest individual steel plant in the world, intends to engage in the transportation business. It has already ordered eight steel steamers for 1907 delivery, and it is understood that eight more steamers will be ordered by this company for 1908 delivery. As part payment for the eight ships ordered, the American Ship Building Company is to take over the plant of the Ship Owners' Dry Dock Company, Chicago, which has been controlled by Moses Taylor, Vice-President of the Lackawanna Steel Company.

It may appear as though this was too great prodigality, but already the new boats put in commission the present year have proved inadequate to meet the rapid expansion of lake commerce. In no other way, perhaps, is the great prosperity of the country better reflected than by the recent growth of lake shipments. The cause of this increase in lake tonnage is the great demand for iron and steel. Nearly all of the workable deposits of iron ore are in the Lake Superior country. They are abundant and of excellent quality. They are mined so easily and transported so cheaply that none of the other known deposits of the country can compete with these ores in furnace cost. Of late years this ore commerce, for which most of these vessels are exclusively built, has grown by astounding leaps and bounds, the mere increase of the movement of 1905 over 1904 being greater than the total movement of any one year up to 1898. This ore commerce is the largest single item in the tonnage of the railroads leading from Lake Erie ports. The ships are unloaded directly into cars, and it is a wonderful sight at the harbors to see the trains slowly moving under the unloading machines, receiving their loads within a short space of time, and steaming away to the furnaces of the Ohio and Pennsylvania valleys.

The following figures show the growth of the ore trade of the great lakes since the canal at Sault Ste. Marie was first opened in 1855:

Year.	Total Shipments.	Year.	Total Shipments.
1855	1,449	1881	2,307,005
1856	36,343	1882	2,965,412
1857	25,646	1883	2,352,840
1858	15,876	1884	2,518,693
1859	68,832	1885	2,466,642
1860	114,401	1886	3,565,144
1861	49,909	1887	4,762,107
1862	124,169	1888	5,063,877
1863	203,055	1889	7,292,643
1864	243,127	1890	9,003,725
1865	236,208	1891	7,071,053
1866	278,796	1892	9,072,241
1867	473,567	1893	6,065,716
1868	491,449	1894	7,748,312
1869	617,444	1895	10,429,037
1870	830,940	1896	9,934,828
1871	779,607	1897	12,464,574
1872	900,901	1898	14,024,673
1873	1,162,458	1899	18,251,804
1874	919,637	1900	19,059,393
1875	891,237	1901	20,593,537
1876	992,764	1902	27,571,121
1877	1,015,087	1903	24,289,878
1878	1,111,100	1904	21,822,839
1879	1,375,691	1905	34,353,456
1880	1,908,745		

Large Passenger Tank Locomotive for the London & North Western.

The accompanying photograph shows one of the 4-4-2 tank locomotives recently built at the Crewe Works, England, for the London & North Western. These engines were designed by George Whale,

Chief Mechanical Engineer of the road, for heavy local and suburban traffic, and they are now in operation between Manchester and Buxton and between Euston and Watford. They are the largest of their type in England. The cylinders are inside and are fitted with Joy's valve gear. The trailing truck has radial axle boxes. The boiler is of the same design as that of the "Precursor" class of express locomotive on the same road, but the total heating surface is slightly less. Some of the principal dimensions follow:

Working steam pressure	175 lbs.
Diameter of cylinders	19 in.
Piston stroke	26 "
Driving wheels, diameter	75 "
Truck wheels, diameter	45 "
Wheelbase, drivers	10 ft.
Wheelbase, total	32 ft. 7 1/2 in.
Heating surface, firebox	161.5 sq. ft.
" " tubes	1,777.5 "
" " total	1,939.0 "
Grate area	22.4 "
Boiler, mean outside diameter	5 ft. 2 1/2 in.
" length of tubes	12 " 3 1/2 "
Firebox, length outside	7 " 4 "
" width outside	4 " 1 "
Tank capacity	1,700 gals.
Coal capacity	2 1/2 tons
Weight, in working order, on drivers	88,480 lbs.
Weight, in working order, total	167,440 "

A Comprehensive Signaling Scheme.*

Your executive committee, on June 6, 1906, appointed a standing committee to consider and report on all subjects assigned to the Interlocking and Block Signal Committee of the American Railway Engineering and Maintenance of Way Association. This year the matters assigned were, first: the three position arm, giving indications in the upper right-hand quadrant, and, second, a complete system of signaling, giving, without confusion, clearly and distinctly, the different indications required for proper handling of traffic. [The upward arm has been approved by the R. S. A.]

Your committee recommends:

First.—That the following indications be adopted as those which are required in a complete system of signals:

Indications—Restricting Rights.

1. Stop at or before reaching, and stay.
2. Stop at or before reaching, and proceed cautiously.
3. Prepare to stop at next signal.
4. Proceed under control, block is occupied.
5. Take siding at next station.
6. Proceed on high speed route prepared to stop at next signal.
7. Proceed on limited speed route prepared to stop at next signal.
8. Proceed on slow speed route prepared to stop at next signal.

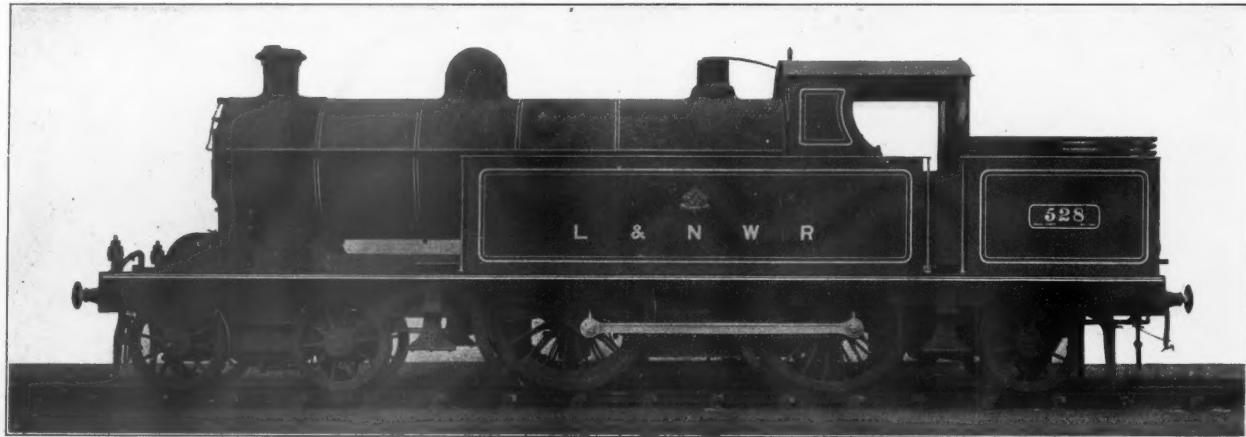
Indications—Conferring Rights.

9. Proceed. Block is clear.
10. Proceed, block clear and next signal at proceed.
11. Proceed on high speed route, next signal at proceed.
12. Proceed on limited speed route, next signal at proceed.
13. Proceed on slow speed route, next signal at proceed.

Indications—Conveying Information.

14. Switch open (Main siding).
15. Switch closed (Main siding).
16. Home switch indicator denotes open switch.
17. Home switch indicator denotes closed switch.
18. Stop for passengers.
19. Need not stop for passengers.
20. Track tank, entrance end.
21. Track tank, exit end.
22. Get orders.

*Committee Report, Railway Signal Association, Washington meeting.



Ten-Wheel 4-4-2 Tank Locomotive for the London & North-Western.

23. Reduce speed. (Track sign.)
24. Resume speed. (Track sign.)

Second.—That the following principles of giving indications govern in formulating a system:

(a) On all signals conferring or restricting rights a red light shall be the night indication for stop. A yellow light shall be the night indication for caution, and a green light the night indication for clear, when displayed in connection with a red light.

(b) That the day indications of semaphore signals be given in the upper right-hand quadrant.

(c) That the semaphore arm horizontal shall indicate stop, inclined upward 45 deg. caution, and inclined upward 90 deg. proceed.

(Note.)—The word caution to be used as indicating the function of a distant signal.)

(d) That two lights shall be displayed on every high speed signal.

(e) That the stop indication shall be given by red lights in a vertical line.

(f) That the stop and proceed indication shall be given by red lights in an oblique line.

(g) That lights in a horizontal line shall be used for information signals.

(h) That automatic home block signals shall have one arm with end pointed.

(i) That interlocking home signals shall always have two full sized arms representing unlimited, and limited or medium speeds, and shall have one low speed arm, distinguished by a greater interval between it and the second arm, than the interval between the top and second arm, and by a dim light at night, when such low speed arm is required. The arms to have square ends.

(j) That the stop indication of dwarf signals shall be given by a purple light.

(k) That the home signal shall be displayed in the 45 deg. position to indicate that the advance signal is at stop.

(l) That interlocking distant signals shall be provided with two arms.

Third.—Diagrams Nos. 1 and 2 illustrate the aspects recommended by your committee to give a part of these indications.

Fourth.—On account of the limited time at the disposal of the committee, it did not complete the work of providing all the aspects required. The types to be used for telegraphic, block and train order signals, for the indication "Take siding at next station," and for distant signals approaching an interlocking, not in automatic block limits; the colors of lights on high switch indicators, and the various forms of other information signals, were not decided on.

Your committee, therefore, recommends the adoption of the aforesaid articles numbered first, second and third, and suggests the types shown on diagrams Nos. 3 and 4, with accompanying notes, for discussion and action of the association.

Committee: W. A. D. Short, Chairman; C. A. Dunham, A. H. Rudd, G. E. Ellis, Azel Ames, Jr., J. C. Mock, C. C. Anthony, J. A. Peabody, H. S. Balliet, T. S. Stevens, L. R. Clausen, H. H. Temple.

Interchange of Traffic Between Electric Lines and Steam Railroads.*

In the early days of electric traction, steam railroad men did not consider electricity as a rival. The electric lines were purely local, limited to the city in which they operated, the cars small in size and low in power; 500 volts was, as it is now, the standard voltage. But with 500 volt power transmission there was a decided limit to the distance that can be covered by a trolley system, and this kept the first trolley cars within close touch of their local power houses.

Not until the development of high tension power transmission with polyphase currents, did the electric roads have anything but a local significance. With the high tension system in use at present, power is generated at any desirable point and transmitted at high pressure to rotary converter sub-stations situated along the line, where the power is transformed to 500 volt direct current, and fed to the trolley. Any length of line can be served by this system if enough sub-stations are provided. This made suburban and interurban roads possible, and as the business on these roads increased, and as they gradually reached out for express, light freight and mail business, the steam roads were compelled to take notice of the changed conditions. An evidence of this is shown by the Sunday excursion rates being made on many roads, which a few years ago would have seemed preposterous. In many other ways have steam roads acknowledged the competition of the electric.

Up to this point in the development, electric traction has been in direct competition with its older and more firmly established rivals, and with but little interchange of traffic between them. Heavy freighting has not been attempted by the electric roads to

any great extent, but in passenger and light freight departments of the interurban roads the rates have been decided in their favor. In any territory covered by both steam and electric roads, it would seem to be to the advantage of both, if some basis could be reached on which the roads could co-operate in moving the traffic of their community. As the situation stands at present the electric lines are in an admirable position to act as feeders for the steam lines. Suburban and interurban roads reach a territory that cannot well be reached by the steam roads, and they give a service through rural sections that is bound to bring considerable traffic to the long distance lines. The advantage of frequently running and convenient trolley cars has been recognized by the large railroad interests, and many roads are buying up competing trolley lines, while others are actively engaged in electrifying portions of their systems. Indications point to considerable interchange of traffic in the future between steam and electric lines, but all students of the subject are of the opinion that we are now on the eve of a new era in electric traction, and that electric roads will soon step into the field as full competitors of the steam roads, that traffic agreements will be as common between steam and electric lines as they are now between steam trunk lines.

Enthusiastic predictions are being freely made of the general adoption of electricity by trunk lines. These predictions are based on the success which has attended the development of alternating current traction. The continued development in interurban railways going on at present, and the frequent and economical service which this development makes possible, it is believed will force the steam roads to adopt this system rather than see their lines paralleled by dangerous competitors. The recent 50,000 mile endurance run of one of the New York Central's electric locomotives with a maintenance charge of only 1.26c per mile is a substantial indication of what may be expected of the new conditions; while the invitation of the New York, New Haven & Hartford Railroad to its engineers and firemen to make application for positions as motormen and assistant motormen, is the first of a series of such actions which it is believed will be a common occurrence in the future.

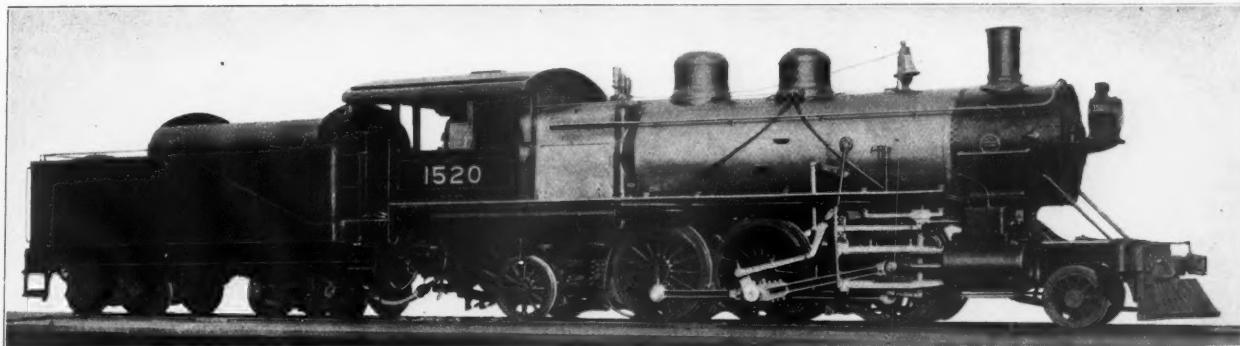
A leading factor in this question is the possibility of placing much more power in front of a train, either passenger or freight, with electricity than with steam, two or three thousand or even more horse power being easily possible. The keynote of the new development in transportation, is high voltage on the trolley, from 6,000 to 12,000 volts being possible at this stage of development. This reduces the volume of current to be handled, thereby doing away with the enormous expenditures for copper feeders common on the 500 volt lines. With alternating currents carried on the trolley instead of a rotary converter sub-station every ten miles or so apart, requiring constant attention, static transformers are placed more than twice that far apart, requiring no attendance, but periodical inspection.

That trolley cars and locomotives will be operated over the same tracks during the period of transition from the old to the new era seems to be settled. In this way locomotives can gradually be relegated to the switching engine class, without that loss of investment which stockholders are so quick to think of when any change is suggested. As a matter of fact, the steam roads with their heavy roadbeds would make excellent electric lines, and when the change is made will win back business on through lines which is now tending to go to the long distance electric lines wherever they exist. When the steam roads find it expedient to adopt the new motive power they will find it will result in a great increase of traffic, as business will naturally gravitate to the roads having increased facilities for handling it. The steam roads will be in a position to operate more frequent passenger and freight units, without a proportionate increase in operating expenses. These units can be of a size sufficient to take care of the traffic, varying large or small, according to the demand; operating passenger and express business on the multiple unit system by which each car furnishes its own power from the line with its own motors, and is controlled in common with the other cars, by the motorman. The heavy freight business would be handled by heavy electric locomotives.

When such a point of development is reached, the interurban roads and long distance lines will be practically one system as far as motive power is concerned, and working arrangements between local and trunk lines with these increased facilities would be a logical result of the change. Cars operated on the trunk lines could be shunted to the local tracks for distribution, and vice-versa. The two classes of roads will then settle naturally into their economic places and adjust themselves the one to the other, according to the class of traffic they are qualified to handle.

It is a peculiar fact that the latest developments in electric traction are such as would make possible such a condition of affairs; as the new single phase motors are in fact only direct current motors more highly developed, and while built to run on high tension, single phase current such as would be used on the main line, they can be adapted to operate on local 500 volt systems. This car could run over the local lines of a community on 500 volt cur-

*A paper read before the National Association of Railway Agents by C. A. Paul, Immigrant Agent, St. Louis & San Francisco.



Prairie Type (2-6-2) Locomotive for the Great Northern.

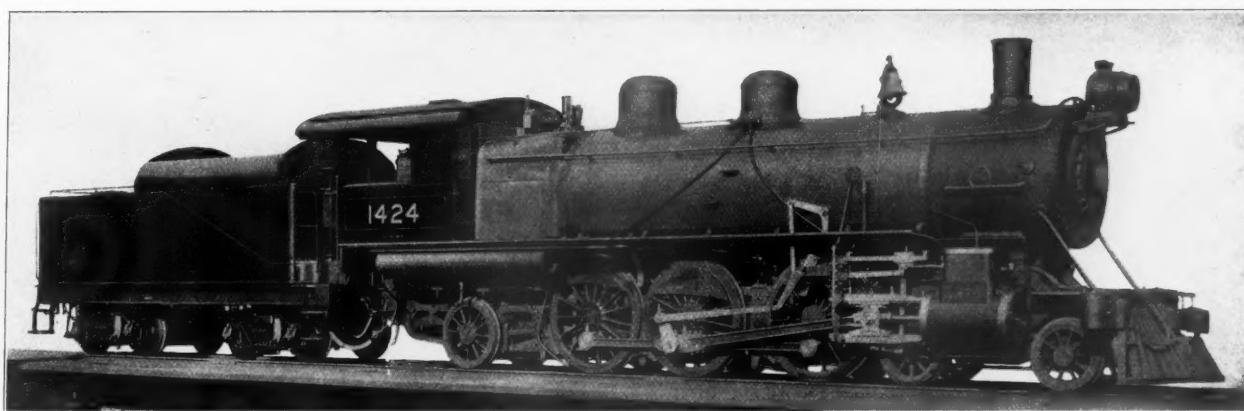
rent, be transferred to the trunk line, make one unit in a through train, controlled by the multiple unit system, furnish its own share of the power on the trunk line, and at the end of its run distribute its load over the local tracks of the city lines. Such an arrangement is one of the possibilities of the future, and would conform to the modern idea of centralization of power at a few economical points.

New Locomotives for the Great Northern.

In addition to the Mallet articulated compounds described in our issue of October 12, the Great Northern has recently received from the Baldwin Locomotive Works 80 Atlantic (4-4-2), Pacific

The Atlantic type engines, ten in number, are Vauclain balanced compounds with 15 in. and 25 in. by 26 in. cylinders. The high-pressure cylinders are between the frames and connect with the forward crank axle. This axle is built up, having a cast-steel web and forged steel bearings. The low-pressure cylinders are outside the frames on a line with the high-pressure cylinders and are connected to the rear drivers. The Stephenson valve motion is used with the eccentrics on the rear driving axle. One striking feature of this design is the enormous weight, 50,000 lbs., carried by the trailing truck. These locomotives are now being used on the Great Northern's Oriental Limited service from the Mississippi river to the coast.

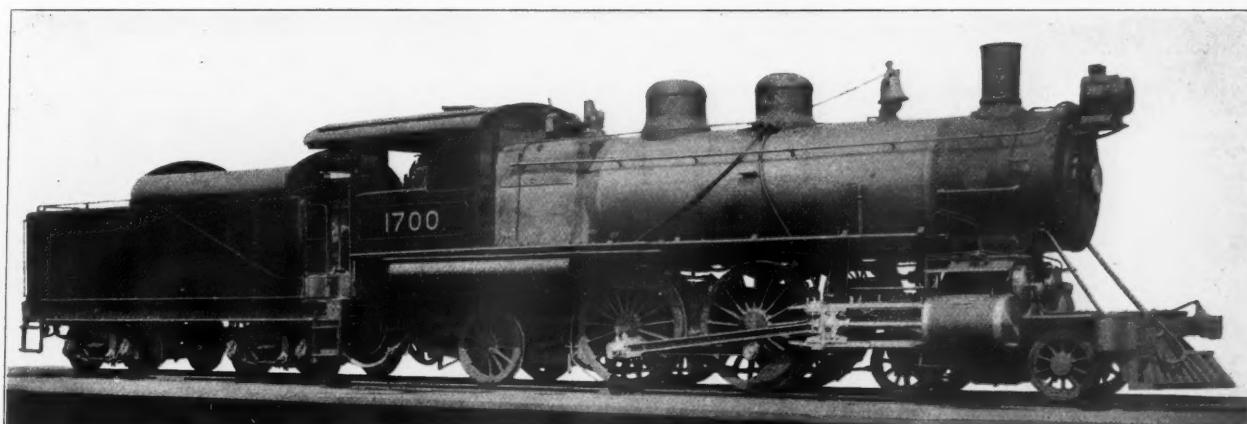
The Pacific type, 20 in number, and the Prairie type, 50 in number, are identical in many respects. Several of the Prairie type



Pacific Type (4-6-2) Locomotive for the Great Northern.

(4-6-2) and Prairie (2-6-2) type locomotives. They are all built on the same general lines, the aim having been to make as many parts as possible interchangeable with present Great Northern equipment. The boilers and heating surface are identical, with the exception of the Pacific type, which requires an extra long boiler with 21-ft. tubes, and consequently has a little larger heating surface. The trailing arrangement is practically the same in all three classes, consisting of the Rushton truck with inside boxes.

locomotives have been in service for a number of months hauling heavy ore trains on the iron range in northern Minnesota. One of the first of this class was exhibited by the Baldwin Locomotive Works during the recent Master Mechanics' Convention at Atlantic City. All of these engines are equipped with Walschaert valve motion. One engine in each class has been designed to take the new Baldwin smoke-box superheater. This requires little change in the front end arrangement and can be easily replaced by regular



Four-Cylinder Balanced Compound Atlantic Type (4-4-2) Locomotive for the Great Northern.

steam pipes if necessary. The following table gives the principal dimensions of the three types:

Type engine & Gt. North. Class Atlantic (K ₁)	Pacific (H ₂)	Prairie (J ₁)
Weight on drivers	112,000 lbs.	151,000 lbs.
" total of engine	211,000 "	227,000 "
Wheel base, driving	7 ft. 1 1/2 in.	13 ft. 0 in.
" total	30 " 4 1/2 "	33 " 5 1/2 in.
" engine and tender	62 " 10 in.	66 " 4 in.
Cylinders, diameter	11.15 in. L. 25 in.	22 in.
Piston stroke	26 in.	30 in.
Valves	Piston.	Slide.
Diameter of wheels, driving	73 in.	69 in.
" " eng. truck	36 in.	36 in.
" " trailing	49 in.	45 in.
Boiler, diameter, front end	72 in.	72 in.
Length of firebox	126 1/4 in.	126 1/4 in.
Width of firebox	66 1/4 in.	66 1/4 in.
Number of tubes	301	301
Diameter of tubes	2 1/4 in.	2 1/4 in.
Length of tubes	18 ft. 6 in.	21 ft. 0 in.
Working steam pressure	210 lbs.	210 lbs.
Heating surface, tubes	3,277.89 sq. ft.	3,720.36 sq. ft.
" firebox	210.77	210.77
" total	3,488.66	3,931.13
Journals, driving	10x10 1/2 in. 9 1/2x12 in.	9 1/2x12 in.
" eng. truck	6x12 in.	6x12 in.
" trailer	8x12 in.	8x12 in.
" tender	5 1/2x10 in.	5 1/2x10 in.
Tender capacity, water	8,000 gal.	8,000 gal.
Tender capacity, coal	13 tons.	13 tons.

Walschaert Valve Gear.*

The cost of maintenance of the Walschaert valve gear I believe to be fully 25 per cent. less than that of the Stephenson link motion. This estimate is based on figures obtained from the Rock Island roundhouse at Burr Oak, Ill., where there are a number of engines equipped with the Walschaert valve gear, while others are equipped with the Stephenson link motion, both classes being in freight service out of that point. Engine failures due to the breaking of valve motion connections during 12 months' service have been very slight. With 15 engines equipped with the

with the Stephenson motion can take a train of the same tonnage and make better time on the level or where the grade is in their favor than they can with those equipped with the Walschaert motion, but when they get on the hills or where the grade is against them they can make better time with the Walschaert than they can with the Stephenson motion. The only reason I can advance for this difference is the manner in which the valves are set, as both engines are of the same size and weight and carry the same steam pressure—185 lbs.

The valves on our engines equipped with the Stephenson link motion are set with 1-32 in. lead at full stroke, making about 1/4 in. lead in the 6-in. cut-off; valve lap, 1 in. Valves on engines equipped with the Walschaert valve gear are set as follows: Five have 1/4 in. lead, which is constant, and 7/8 in. lap; the remainder have 3-16 in. lead and 15-16 in. lap. These latter give the best results. It must be understood that the engines referred to were built for freight service and were not intended for high speed.

Unit Costs of Railroad Building.*

II.

The costs given below are for a first-class branch line 12 miles long, giving the St. Louis Southwestern an entrance into Dallas, Texas. The road is well ballasted and laid with 75-lb. rail.

(1) Length of new railroad, 12.13 miles main single track, 1.52 miles sidings.

(2) Year built, winter 1903-4.

(3) Cost for distance of 12.13 miles, including preliminary survey, clearing right of way, etc., but not including real estate, stations, equipment or signals, \$19,649.24 per mile.

(4) Brief description: Line follows dividing ridge between two North Texas streams. No side hill cuts. Considerable fill but ground mostly level. Line being on ridge, but few openings required, all of which were made of a permanent character, including



Crossing of Dallas Branch of the St. Louis Southwestern over Missouri, Kansas & Texas Tracks.

Walschaert valve gear we have had only three failures that were chargeable to valve motion failing, while with engines equipped with the Stephenson link motion we have had at least three times as many failures due to the link motion getting out of order.

In view of the fact that the Walschaert link, not being influenced by a backing up eccentric, does not rock through as large an angle as the ordinary Stephenson link, this means that the link has a more favorable action on the link block with the Walschaert gear and does not have a tendency to spring the motion as much as the Stephenson link when at and near the extremity of its stroke. It should also be noticed that with the Walschaert gear all parts in connection with the valve move in almost a straight line, which does away with the up-and-down motion that is very noticeable with the Stephenson link. There is no question in my mind that this up-and-down motion has a tendency to cause a rocking action of the valve on its seat, whereas with the Walschaert link the valve has an easy gliding motion and is not so apt to hollow the valve seat.

My experience has been that where tonnage is considered the main factor and speed a secondary consideration, the Walschaert motion is superior to the Stephenson in tonnage capacity of engines, as it will handle a train better at a slow rate of speed with very little slipping, while with the Stephenson motion at a slow rate of speed the engine requires greater care in handling in order to prevent this trouble, making it necessary to use a greater amount of sand.

In regard to speed, I am not in a position to say which motion has the advantage, as none of our engines in passenger service are equipped with the Walschaert valve gear. In freight service we have about the same number of each, and they take their turn in all classes of freight, both fast and slow. It seems to be the general opinion of the men running these engines that engines equipped

concrete arch culverts, cast-iron pipe, vitrified tile drain, etc. Excavated material mostly earth; some loose rock.

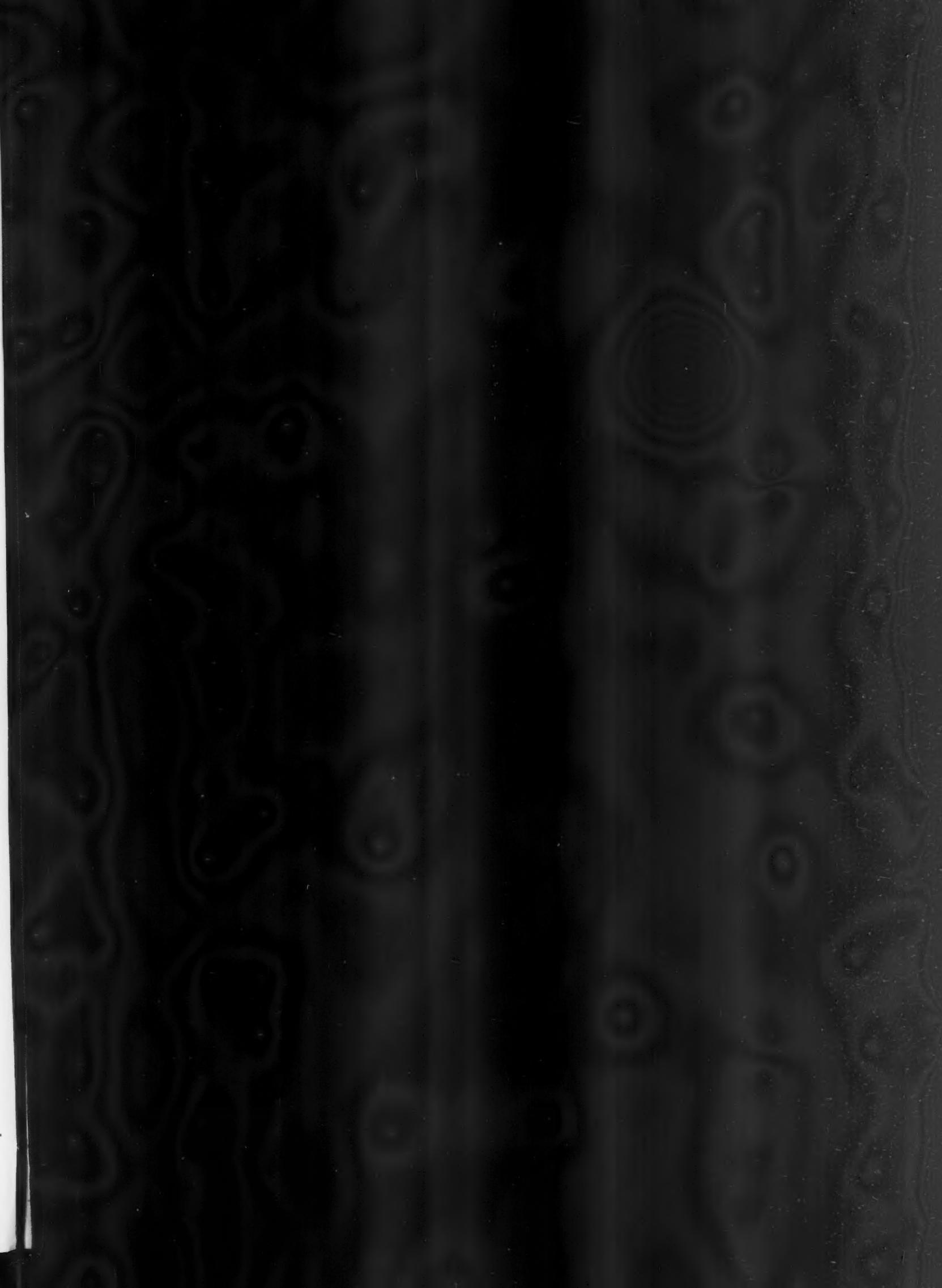
The line is practically one tangent with the exception of 2,200 ft. of 1 deg. curve which occurs about midway and a few other light curves entering the suburbs of Dallas. The line crosses the M., K. & T. overhead on the edge of the Trinity river bottoms entering Dallas; the crossing consists of three 50-ft. deck plate girder spans carried on steel columns and concrete masonry abutments. Immediately after crossing the M., K. & T., the line enters the Trinity river bottoms and continues along the edge of the bottoms on a high embankment until the crossing of the Texas & Pacific on Pacific avenue, Dallas, is reached. The overhead crossing with the M., K. & T. required a heavy embankment through Trinity river bottoms, amounting to a quarter million cubic yards in a distance of about one mile. The material for this embankment was obtained by grading down ground to be used for an outer yard of the Dallas Terminal Railway and Union Depot Company. Steam shovels were used in excavating and the dirt hauled by train to make this fill. This method enabled the grading to be done for the outer yard, and at the same time gave waste material to fill the bottoms. The balance of the grading on the extension was done by teams.

The following table shows in detail the cost of the road:

Engineering	\$48,924.46	is chargeable to the Dallas extension proper, the balance to outer yard, Lamar street wye, etc.)	\$6,322.57
Grading	77,276.94		
Bridges, trestles and culverts	41,661.75		
Ties	26,838.38		
Rails	37,607.06		
Track fastenings	5,596.28		
Frogs and switches	1,176.74		
Ballast	30,526.14		
Tracklaying and surfacing	9,510.51		
Crossings, cattle guards and signs	1,928.81		
Interlocking or signal apparatus			
Total			\$238,345.18

*Extracts from a paper presented to the convention of the Traveling Engineers' Association, by O. H. Rehmeyer, C. R. I. & P. Ry.

*The first article of this series giving cost of railroad building in the Eastern States was printed in the *Railroad Gazette*, Sept. 7, 1906.





GENERAL NEWS SECTION

NOTES.

Last Saturday night the last remaining cable railroad in Chicago ceased operations, an electric line taking its place.

An embargo has again been placed on freight shipments to San Francisco over the Southern Pacific. More than 3,500 cars are standing on the tracks there.

Press despatches of October 21 reported a strike of workmen in the car shops of the Boston & Albany at Allston, Mass., as a protest against the introduction of piece work.

It is announced in Chicago that the New York Central is to sell 1,000-mile tickets at \$20, good for bearer, throughout its lines, which means from New York and Boston to Cincinnati, Chicago and St. Louis.

Philadelphia newspapers say that the Pennsylvania will henceforth give no free interstate rides to the personal or household servants of its officers or employees, such practice having been decided to be illegal.

The Federal Grand Jury at Nashville, Tenn., has returned three indictments against the Louisville & Nashville for discriminating or threatening to discriminate against an employee (telegraph operator) for belonging to a labor organization.

The Missouri Pacific Railway, in conjunction with the Missouri State Board of Agriculture, is running a special train to educate the farmers of Missouri in the art of raising poultry. Competent men will give lectures illustrated by incubators and patent feeds.

Press despatches from Washington say that the Department of Justice, at the instance of the Interstate Commerce Commission, is to prosecute the former president and former general manager of the Ann Arbor Railroad for paying rebates to the Toledo Ice Company.

The railroads of Ireland, it seems likely, will be taken over by the British government with a view to furnishing new transportation facilities required for developing agricultural resources. Private enterprise has failed to give Ireland the railroads which she needs.

According to Chicago newspapers the Chicago, Cincinnati & Louisville is to make local fares between all important points two cents a mile, beginning Nov. 1. If all of the "important points" are to have the benefit of this reduction how will the rates to the unimportant places be adjusted?

A press despatch from Seattle says that the Pacific Coast Lumber Manufacturers' Association is raising a fund of \$8,000 to prosecute a complaint before the Interstate Commerce Commission against the Northern Pacific for discrimination in the distribution of cars to lumber shippers.

The New York State Railroad Commission has issued to the railroads of the state a circular calling their attention to the need of establishing the block system; also recommending that in view of the large number of stations in the state where the platforms are very low all passenger cars be equipped with "stepping stones," meaning, presumably, small wooden box steps such as are carried by porters of Pullman cars.

An officer of the New York Central says that 68 season ticket passengers who left the trains of that company to travel into New York City by the Subway, when it was opened, have all returned to the New York Central. It appears that these passengers all live at King's Bridge, which is the northern terminus of the Subway, about 12 miles from the City Hall. Three others who deserted the Central are still unaccounted for.

It is announced in Detroit that the Detroit United Railway, operating most of the street car lines of that city, will during five hours of the day sell 10 tickets for 25 cents and during the other 19 hours six for 25. There are a few lines in the city on which tickets are now sold at the rate of eight for 25 cents. This lowering of rates is spoken of as an experiment and also as a move in the company's campaign to secure an 18-year extension of its franchise.

At Minneapolis, October 23, according to a press despatch, seven men received an "immunity bath." It was in the United States Court before the special grand jury summoned to hear evidence regarding illegal freights. The men were C. S. Corl, of the Devereaux Grain Company; R. G. Kyle, agent for the Great Northern Railroad at Minneapolis Junction; George G. Ingraham, of the Great Northern freight claims department; F. E. Draper, Auditor of the

Great Northern; R. W. Bryan, Superintendent of Transportation of the Great Northern; J. P. Dooley, Freight Agent of the Great Northern at Superior, Wis.; W. J. Bower, General Freight Agent of the Great Northern at Duluth. It is said that the evidence tended to show that a rebate of a half cent a bushel had been received by a big grain firm for all grain shipped over the Great Northern.

An Englishman who favors government ownership has hit upon a plan for the government's acquiring the railroads which rather surpasses the recently proposed plan in the Argentine Republic to buy the railroads out of the proceeds of a tax on their gross receipts. The proposal is to grant a life annuity to the shareholders and their widows, or orphan children until they reach the age of 21, with certain advantages to indigent relatives, at the death of the last of these beneficiaries the railroads to come into possession of the state. With such an arrangement, the average man on being married, instead of taking out an insurance policy, would buy railroad stock.

Canadian Wheat Crop.

According to a statement made by the Ottawa Department of Trade and Commerce there are 4,500,000 acres of wheat fields under cultivation in western Canada and the yield will be 85,000,000 bushels. Unusual hot weather in August caused a large falling off. The quality of the grain, as estimated from the 6,000,000 bushels already shipped, is as follows: No. 1 hard, 25 per cent.; No. 1 northern, 40 per cent., and No. 2 northern, 50 per cent.

Positions Open in New South Wales.

The New South Wales Railways & Tramways, operating 3,370 miles of steam railroads and 125 miles of street railways, have hitherto been managed by three commissioners appointed by the government, which owns the lines. This commission has been abolished and three new offices created. They are: Chief commissioner, with a salary of \$15,000; assistant railway commissioner, \$7,500, and tramway commissioner, \$7,500. These positions are not yet filled and applications should be made in writing by Nov. 19 to T. A. Coghlan, agent-general for New South Wales, 125 Cannon street, London E. C., England. The New York representatives of the New South Wales government are R. W. Cameron & Co., 23 South William street. The gross earnings of the New South Wales Railways & Tramways for the year ended June 30, 1906, were \$20,538,736; net earnings, \$9,343,074.

John Scott Medal.

The Franklin Institute of Philadelphia has awarded the John Scott legacy premium and medal to Max E. Schmidt, of New York, for "decided improvements which he has made with a view of bringing the moving platforms into daily practical use as a means of transportation in large cities." These improvements are covered chiefly by a United States patent issued in 1903. The committee on science and the arts of the Franklin Institute finds "that from an engineering standpoint a great improvement has been made, the construction required by the later patent being much more substantial than the original form. The flexible rail is entirely eliminated, and the greater part of the machinery is stationary and will permit inspection at any time. With the present construction much sharper curves for the alignment of the road are admissible. The construction is such that derailment or any other serious accident seems remote."

Southern Pacific School for Shopmen.

Early in September the Southern Pacific reopened its technical school for shop employees at Sparks, Nevada. This year a day school has been started for the first and second year apprentices. Classes are held every Monday and Tuesday mornings from 7 to 8.50 o'clock, and during this period the apprentices who attend the school are paid as if they were at work in the shops. They are to be taught arithmetic, elementary mechanics, mechanical drawing, link motion and valve gears. There are classes in the evenings of these same days for the older apprentices and for all the men in the shops. Instruction is given by teachers of the Nevada University, but the work is under the direct supervision of the railroad company.

September Traffic Through the Soo Canals.

The vessel passages through both the United States and the Canadian canals at Sault Ste. Marie during September, 1906, were 2,912, with a registered tonnage of 5,625,883 net tons, as compared with 2,767 ships of 4,700,015 registered tonnage during the corresponding period in 1905. The eastbound freight tonnage was 5,865,015, an increase of 1,092,680 tons, and the westbound was 1,385,144 tons, an increase of 274,535 tons. Of the eastbound freight, the amounts of copper and of grain, other than wheat, carried decreased, there having been only 3,602,545 bushels of grain carried

this year as compared with 4,614,420 bushels last year. The amounts of other classes of freight carried in this direction increased, most important being wheat, 7,683,841 bushels, an increase of 2,363,013 bushels. All classes of westbound freight increased; the most noticeable gain was in the traffic in soft coal, which amounted to 1,070,495 tons, an increase of 301,070 tons.

Dedication of University of Pennsylvania Engineering Building.

The University of Pennsylvania on October 19 dedicated its new engineering building. Its high architectural quality is likely to impress those who are in the habit of regarding engineering laboratories as necessarily shop-like in their appearance. Even the shop laboratories open from corridors which are lined with white marble. The advanced laboratories, especially those for steam engineering and materials testing are admirably equipped. The whole building, with its equipment, is said to have cost about \$800,000; it is not only a notable addition to the facilities of the University, but in a larger sense an important contribution to the educational interests of the whole country.

The dedicatory exercises were attended by engineers and professors from many parts of the country. Formally appointed delegates were present, representing the governments of Mexico, France, Germany and the United States. In addition to the exchange of keys and the formal acts of dedication, the degree of Doctor of Science was conferred on a number of distinguished engineers. It was, of course, fitting that Professors Spangler and Marburg, whose efforts have counted so much in the design and equipment of the building should be thus honored, and readers of the *Railroad Gazette* will find interest in the fact that Mr. Samuel Vauclain was also among those chosen. Besides these, there were Prof. Frederick P. Stearns, whose service as an engineer of public works is generally known; Frederick Winslow Taylor, president of the American Society of Mechanical Engineers; Samuel Sheldon, president of the American Institute of Electrical Engineers; Mansfield Merriman, the long-time professor and masterful text-book writer; Charles Whiteside Rae, Engineer-in-Chief of the United States Navy; Alexander Mackenzie, colonel of United States Engineers and a member of the general staff; John Fritz, past-president of the American Society of Mechanical Engineers; William Phipps Blake, geologist, explorer and professor; Marie Michel Henri Vetillart, representative of the French Government at the dedication and expert engineer in harbor improvement and canal construction, and Ramon Ibarrola, Chief of the Hydrographic Commission of Mexico.

The engineer's work is not often spectacular and in many cases where service is performed, it is veiled in comparative obscurity, but in this case a great university in celebrating an achievement wrought for the upbuilding of its engineering departments was pleased to recall the important services of certain of the world's great engineers. It is perhaps safe to say that the friends of none of those who were thus honored will find greater pleasure in the event, than those of the vigorous, able and always inspiring Dr. Vauclain.

New York Central Fined \$114,000.

Judge Holt in the United States Circuit Court, New York City, last week fined the New York Central & Hudson River Railroad the sum of \$108,000—\$18,000 on each of six counts—for granting rebates on sugar, in the cases recently tried and reported in the *Railroad Gazette*. Frederick L. Pomeroy, Assistant Traffic Manager of the railroad, was fined \$1,000 on each count, a total of \$6,000. Motions to set aside the verdict and grant a new trial were based chiefly on the allegation that the court had erred in its denial of the request for a severance of the issues against the defendant corporation and Pomeroy. A stay of 60 days was granted in which to perfect an appeal.

"Such a violation of law," said Judge Holt in passing sentence, "is much more heinous than the ordinary common, vulgar crimes usually brought before the criminal courts. Those are crimes of sudden passion and temptation. These crimes were committed by men of education, business experience, and standing in the community. As such they should set an example of obedience to the law, on the maintenance of which the security of their property depends."

"This corporation received large and valuable public privileges. It was under the highest obligations to treat all citizens alike, and not to grant any unjust discriminations. This was a secret crime, the proof of which was difficult to obtain. The law was originally passed 20 years ago. The complaints of the granting of rebates by railroads were frequent and insistent. Congress passed amendatory legislation, but so difficult was the securing of the necessary proof that this is the first case brought in this court and, with the exception of one recently in Philadelphia, the only one in the east. But few have been tried in the west."

"Under these circumstances and for an offense so clearly flagrant, it is the duty of the court to impose a penalty commensurate with the gravity of the offense. Between the two defendants the principal penalty should be imposed upon the corporation. The

individual defendant acted without advantage to himself, in accordance with what he deemed to be the policy and wishes of his employers.

"It is not too much to say," said Judge Holt, "that if the business had been carried on upon this basis and the discrimination continued in favor of one shipper it might have been that competitors would have been driven out of business."

On the trial the road claimed that in granting claims for over-charges the railroad made no unlawful refunds, and that the Elkins law was unconstitutional in discriminating against the railroads by allowing a competing all-water route to carry sugar at about half the rate by rail. One of the principal counsel for the New York Central said: "There are many points in the Elkins law that have never been decided by the United States Supreme Court. One point is whether a corporation or its officers are guilty of an act charged, and another is whether on conviction in such cases both should be adjudged guilty under the same indictment if the alleged violation is solely by an officer and not by the corporation."

The failure of the railroad at the trial to put in any defence was at first supposed to mean that the case would go by default, but the railroad did technically put in a defence. The evidence was ready, but an understanding was reached with the United States District Attorney whereby the railroad acknowledged the acts complained of, and delay was thus avoided.

Effect of Lions on Railroad Operation.

The lions of East Africa appear to be watching the progress of civilization with deep interest, and nothing has done more to arouse their curiosity and wonder than the trains on the Uganda Railroad. This road, from the Indian ocean to Victoria Nyanza, is 584 miles long, and between the terminal points are 39 stations. The line is managed on the system of the Indian railroads, and most of the men in the track, train and station service are East Indians. The Indian station agent is known as a babu, and he leads a lonesome life. Simba, for example, where the lions have been making a special study of the railroad system, has only a station building, a water tank for the engines and a side-track, this being one of the places where trains pass each other on the single-track road.

The trouble began at Simba about a year ago, when the traffic manager at Nairobi one morning received this astonishing telegram from the babu at Simba: "A lion has been bothering me for three nights. He comes up on the station platform and goes to sleep. Then he walks up and down, scratches on the wall and door and tries to get into the office. Please send cartridges for a Snider rifle by the first train for my protection. I have blank cartridges, but they are of no use against lions."

This profound observation has the earmarks of sober truth. Whether the lion desired to buy a ticket or whether a fellow-feeling for the lonesome babu induced him to try to cultivate his acquaintance is not known, but it is quite certain that blank cartridges were not appropriate ammunition, and that ball cartridges were in demand. It is to be supposed that they were promptly supplied, but, if so, they did not make a deep impression upon the pests, for in August another hair-raising telegram reached the traffic manager, as follows:

"August 17, 2.45 a.m.

"Urgent. To Traffic Manager:

"A lion is on the platform. Please instruct guard and engineer to proceed carefully, and to make no signals in the yard. Tell the guard to advise passengers not to get out here, and to be very careful himself when he comes into the office."

This distress signal from Simba had the immediate result of starting a British sportsman in that direction, who shot three lions, but was badly hurt before killing the third one. The poor babu was left again in the wilderness, but not exactly the monarch of all he surveyed. He told the train hands every day that he could not sleep at nights and his nerves were badly shaken. There was nothing doing, however, for several weeks after the great day when three lions had been laid low within a few rods of the station. Then came another nervous telegram.

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this year as compared with 4,614,420 bushels last year. The amounts of other classes of freight carried in this direction increased, most important being wheat, 7,683,841 bushels, an increase of 2,363,013 bushels. All classes of westbound freight increased; the most noticeable gain was in the traffic in soft coal, which amounted to 1,070,495 tons, an increase of 301,070 tons.

Dedication of University of Pennsylvania Engineering Building.

The University of Pennsylvania on October 19 dedicated its new engineering building. Its high architectural quality is likely to impress those who are in the habit of regarding engineering laboratories as necessarily shop-like in their appearance. Even the shop laboratories open from corridors which are lined with white marble. The advanced laboratories, especially those for steam engineering and materials testing are admirably equipped. The whole building, with its equipment, is said to have cost about \$800,000; it is not only a notable addition to the facilities of the University, but in a larger sense an important contribution to the educational interests of the whole country.

The dedicatory exercises were attended by engineers and professors from many parts of the country. Formally appointed delegates were present, representing the governments of Mexico, France, Germany and the United States. In addition to the exchange of keys and the formal acts of dedication, the degree of Doctor of Science was conferred on a number of distinguished engineers. It was, of course, fitting that Professors Spangler and Marburg, whose efforts have counted so much in the design and equipment of the building should be thus honored, and readers of the *Railroad Gazette* will find interest in the fact that Mr. Samuel Vauclain was also among those chosen. Besides these, there were Prof. Frederick P. Stearns, whose service as an engineer of public works is generally known; Frederick Winslow Taylor, president of the American Society of Mechanical Engineers; Samuel Sheldon, president of the American Institute of Electrical Engineers; Mansfield Merriman, the long-time professor and masterful text-book writer; Charles Whiteside Rae, Engineer-in-Chief of the United States Navy; Alexander Mackenzie, colonel of United States Engineers and a member of the general staff; John Fritz, past-president of the American Society of Mechanical Engineers; William Phipps Blake, geologist, explorer and professor; Marie Michel Henri Vétillart, representative of the French Government at the dedication and expert engineer in harbor improvement and canal construction, and Ramon Ibarrola, Chief of the Hydrographic Commission of Mexico.

The engineer's work is not often spectacular and in many cases where service is performed, it is veiled in comparative obscurity, but in this case a great university in celebrating an achievement wrought for the upbuilding of its engineering departments was pleased to recall the important services of certain of the world's great engineers. It is perhaps safe to say that the friends of none of those who were thus honored will find greater pleasure in the event, than those of the vigorous, able and always inspiring Dr. Vauclain.

New York Central Fined \$114,000.

Judge Holt in the United States Circuit Court, New York City, last week fined the New York Central & Hudson River Railroad the sum of \$108,000—\$18,000 on each of six counts—for granting rebates on sugar, in the cases recently tried and reported in the *Railroad Gazette*. Frederick L. Pomeroy, Assistant Traffic Manager of the railroad, was fined \$1,000 on each count, a total of \$6,000. Motions to set aside the verdict and grant a new trial were based chiefly on the allegation that the court had erred in its denial of the request for a severance of the issues against the defendant corporation and Pomeroy. A stay of 60 days was granted in which to perfect an appeal.

"Such a violation of law," said Judge Holt in passing sentence, "is much more heinous than the ordinary common, vulgar crimes usually brought before the criminal courts. Those are crimes of sudden passion and temptation. These crimes were committed by men of education, business experience, and standing in the community. As such they should set an example of obedience to the law, on the maintenance of which the security of their property depends."

"This corporation received large and valuable public privileges. It was under the highest obligations to treat all citizens alike, and not to grant any unjust discriminations. This was a secret crime, the proof of which was difficult to obtain. The law was originally passed 20 years ago. The complaints of the granting of rebates by railroads were frequent and insistent. Congress passed amendatory legislation, but so difficult was the securing of the necessary proof that this is the first case brought in this court and, with the exception of one recently in Philadelphia, the only one in the east. But few have been tried in the west."

"Under these circumstances and for an offense so clearly flagrant, it is the duty of the court to impose a penalty commensurate with the gravity of the offense. Between the two defendants the principal penalty should be imposed upon the corporation. The

individual defendant acted without advantage to himself, in accordance with what he deemed to be the policy and wishes of his employers.

"It is not too much to say," said Judge Holt, "that if the business had been carried on upon this basis and the discrimination continued in favor of one shipper it might have been that competitors would have been driven out of business."

On the trial the road claimed that in granting claims for over-charges the railroad made no unlawful refunds, and that the Elkins law was unconstitutional in discriminating against the railroads by allowing a competing all-water route to carry sugar at about half the rate by rail. One of the principal counsel for the New York Central said: "There are many points in the Elkins law that have never been decided by the United States Supreme Court. One point is whether a corporation or its officers are guilty of an act charged, and another is whether on conviction in such cases both should be adjudged guilty under the same indictment if the alleged violation is solely by an officer and not by the corporation."

The failure of the railroad at the trial to put in any defence was at first supposed to mean that the case would go by default, but the railroad did technically put in a defence. The evidence was ready, but an understanding was reached with the United States District Attorney whereby the railroad acknowledged the acts complained of, and delay was thus avoided.

Effect of Lions on Railroad Operation.

The lions of East Africa appear to be watching the progress of civilization with deep interest, and nothing has done more to arouse their curiosity and wonder than the trains on the Uganda Railroad. This road, from the Indian ocean to Victoria Nyanza, is 584 miles long, and between the terminal points are 39 stations. The line is managed on the system of the Indian railroads, and most of the men in the track, train and station service are East Indians. The Indian station agent is known as a babu, and he leads a lonesome life. Simba, for example, where the lions have been making a special study of the railroad system, has only a station building, a water tank for the engines and a side-track, this being one of the places where trains pass each other on the single-track road.

The trouble began at Simba about a year ago, when the traffic manager at Nairobi one morning received this astonishing telegram from the babu at Simba: "A lion has been bothering me for three nights. He comes up on the station platform and goes to sleep. Then he walks up and down, scratches on the wall and door and tries to get into the office. Please send cartridges for a Snider rifle by the first train for my protection. I have blank cartridges, but they are of no use against lions."

This profound observation has the earmarks of sober truth. Whether the lion desired to buy a ticket or whether a fellow-feeling for the lonesome babu induced him to try to cultivate his acquaintance is not known, but it is quite certain that blank cartridges were not appropriate ammunition, and that ball cartridges were in demand. It is to be supposed that they were promptly supplied, but, if so, they did not make a deep impression upon the pests, for in August another hair-raising telegram reached the traffic manager, as follows:

"August 17, 2.45 a.m.

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Operating Officers.

Buffalo, Rochester & Pittsburg.—Peter Fraser, trainmaster at Du Bois, Pa., has been appointed Superintendent at that place.

Detroit, Toledo & Ironton.—J. H. Fraser, Assistant Superintendent, has been appointed Superintendent, with office at Springfield, Ohio, and the office of Assistant Superintendent has been abolished.

Lehigh & Hudson River.—L. W. Berry, formerly inspector of transportation of the Toledo, St. Louis & Western, has been appointed Superintendent of the L. & H. R., succeeding W. E. Baily, resigned on account of ill health.

Mexican Central.—J. H. Clegg, trainmaster at Aguascalientes, has been appointed Acting Superintendent at Silao, succeeding B. Collins, deceased.

New York Central & Hudson River.—William J. Fripp, who was recently appointed Superintendent of the River division, was born in New York state in 1863 and educated at the Albany High School. He began railroad work in 1889 as a yard clerk at West Albany, N. Y., on the New York Central. After five years he was made time keeper and chief clerk, and three years later was transferred to the office of the superintendent at Albany. Here he remained for four years and then returned to West Albany as general dispatcher. The next year he was appointed freight trainmaster. In 1898 he was made passenger trainmaster, and in 1902 was appointed Assistant Superintendent of the Mohawk division, where he remained until his recent promotion.



W. J. Fripp.

Cornelius Christie, who was recently appointed Superintendent of the Rome, Watertown & Ogdensburg division of the New York Central & Hudson River, was born in 1864 and began railroad work in 1881 as a telegraph operator on the New York, Susquehanna & Western. In 1883 he went to the West Shore, now the River division of the New York Central, as a telegraph operator. Five years later he was made train dispatcher of the same road, and in 1895 was appointed trainmaster. In 1902 he was made Superintendent of the River division, where he remained until his recent transfer to the Rome, Watertown & Ogdensburg division.



C. Christie.

Traffic Officers.

Chicago, Peoria & St. Louis.—C. W. Galligan, Assistant General Freight Agent, has been appointed General Freight Agent, succeeding W. M. Bushnell, resigned to go to the Chicago & Alton.

Delaware, Lackawanna & Western.—W. P. Colton, Industrial Agent, has resigned to go into other business.

Engineering and Rolling Stock Officers.

Atchison, Topeka & Santa Fe.—See Atchison, Topeka & Santa Fe Coast Lines.

Atchison, Topeka & Santa Fe Coast Lines.—W. E. George, Master Mechanic at Needles, Cal., has been appointed Master Mechanic of the A. T. & S. F. at Winslow, Ariz., succeeding H. G. Wall, who takes Mr. George's place at Needles.

Denver & Rio Grande.—See Rio Grande Western.

East Broad Top.—A. E. Bachert has been appointed Chief Engineer, with office at Robertsdale, Pa.

Erie.—M. R. Strong, Engineer of Bridges and Buildings, has resigned to go into other business, and his former duties will be performed until further notice by F. A. Howard, Assistant Engineer.

Missouri Pacific.—William Donald, Master Mechanic of the Rio Grande Western at Salt Lake City, has been appointed Master Mechanic of the Missouri Pacific at Little Rock, Ark.

Pennsylvania.—F. A. Smock has been appointed Master Mechanic at Meadows, N. J., succeeding J. W. Sanford, retired.

Pittsburg, Shawmut & Northern.—Herbert Wilgus, formerly Engineer of the Brooklyn Heights Railroad, has been appointed Chief Engineer of the Pittsburg, Shawmut & Northern, with office at Olean, N. Y., succeeding A. G. McComb, resigned to go into other business.

Rio Grande Western.—E. G. Haskins, Acting Master Mechanic of the Denver & Rio Grande at Salida, Colo., has been appointed Master Mechanic of the Rio Grande Western at Salt Lake City, succeeding William Donald, resigned to go to the Missouri Pacific. See Missouri Pacific.

St. Louis, Iron Mountain & Southern.—J. W. Ruffner has been appointed Master Mechanic at Ferriday, La., succeeding J. B. Tenant.

Union Pacific.—G. H. Pickert has been appointed Master Mechanic at Pullman, Colo., succeeding George Thompson, resigned.

LOCOMOTIVE BUILDING.

The Southern will not for the present place its order for 100 locomotives.

The Grand Rapids & Indiana has asked prices on four 10-wheel (4-6-0) locomotives.

The Maine Central has ordered two Pacific (4-6-2) locomotives from the American Locomotive Co., for April, 1907, delivery.

The Buffalo, Rochester & Pittsburg has ordered 20 heavy locomotives from the American Locomotive Co., to be built at the Dunkirk Works.

The Canadian Pacific has ordered 35 locomotives from the Locomotive & Machine Co., of Montreal, in addition to those reported in our issue of October 12.

The Mobile & Ohio has ordered 10 additional ten-wheel (4-6-0) freight locomotives from the Baldwin Locomotive Works, for December delivery. These locomotives are duplicates of the 10 ten-wheel passenger locomotives reported in our issue of June 15 last, with the exception of the diameter of the drivers, which are 62 in. for the freight locomotives.

The Fort Worth & Denver City has ordered two simple switching locomotives from the American Locomotive Co., for November 15 delivery. The specifications are as follows:

General Dimensions.	
Type of locomotive	Switching
Weight, total	145,000 lbs.
Diameter of drivers	51 in.
Cylinders	20 in x 26 in.
Boiler, type	Straight top
" number of tubes	311
" tubes, make of	Shelby seamless
" diameter of tubes	.2 in.
" length of tubes	11 ft.
Firebox, length	10 ⁵ / ₈ in.
" width	41 ³ / ₈ in.
" material	Otis Steel Co.
Tank capacity	4,500 gals.
Coal capacity	8 tons

Special Equipment.	
Boiler lagging	Keasbey & Mattison, sectional magnesia
Brake-beams	Sterlingworth
Couplers	Tower
Headlights	Star Headlight Co.
Piston rod packings	Jerome metallic
Sanding devices	Leach
Sight-feed lubricators	Nathan
Spring	Railway Steel Springs Co.

CAR BUILDING.

The St. Louis & San Francisco is in the market for 400 ballast cars.

The Chicago Great Western is building 500 box cars at its South Park, Minn., shops.

The Buffalo, Rochester & Pittsburg has ordered 500 steel coal cars of 50 tons capacity.

The Delaware, Lackawanna & Western is in the market for a number of self-clearing hopper bottom gondolas.

The Minneapolis, St. Paul & Sault Ste. Marie is about to order four compartment cars with observation platform and buffet.

The Chicago, Rock Island & Pacific, as reported in our issue of October 12, has ordered 2,000 box cars of 80,000 lbs. capacity, for February to June, 1907, delivery; 400 furniture cars of 60,000 lbs. capacity, for February, 1907, delivery; 300 flat cars of 100,000 lbs. capacity, for April, 1907, delivery; 250 stock cars of 80,000 lbs. capacity, for May, 1907, delivery, and 250 hopper cars of 100,000 lbs. capacity, for March and April, 1907, delivery, all from the American Car & Foundry Co.; 650 dump cars of 100,000 lbs. capacity, for January and February, 1907, delivery, from the National Dump Car Co., and 100 ballast cars of 80,000 lbs. capacity from the Rodger Ballast Car Co., for February, 1907, delivery. The box cars will be 40 ft. long, 8 ft. 6 in. wide and 8 ft. high, inside measurements. The furniture cars will be 40 ft. long, 9 ft. wide and 10 ft. high, inside measurements. The flat cars will be 43 ft. long and 10 ft. wide, over all. The stock cars will be 36 ft. 6 1/2 in. long, 8 ft. 9 3/4 in. wide and 7 ft. 1 1/4 in. high, inside measurements. The hopper cars will be 33 ft. 9 in. long and 8 ft. 9 1/2 in. wide, inside measurements. The dump cars will be 41 ft. long, 9 ft. 7 in. wide and 44 in. high, inside measurements. The ballast cars will be 24 ft. long, 8 ft. 8 in. wide and 4 ft. high, inside measurements. The special equipment for all includes:

Bolsters (for box, furniture, flat and stock)	Scullin-Gallagher
Bolsters (for hopper and dump)	General Castings Co.
Bolsters (for ballast)	Commonwealth Steel Co.
Brake-beams	Simplex
Brake-shoes	Streeter
Brasses	Hewitt
Couplers (1,500 box, furniture, flat, stock and ballast)	Monarch
Couplers (for 500 box, hopper and dump)	Major
Door fastenings (for box, furniture and stock)	Positive
Doors (for box, furniture and stock)	Climax
Draft rigging (for box, furniture and dump)	Miner
Draft rigging (for flat, stock and hopper)	Parlow
Draft rigging (for ballast)	Transon Draft Gear Co.
Journal boxes	Symington
Roofs (for box and furniture)	Murphy
Springs (for all but ballast)	Railway Steel Spring Co.
Trucks	Arch-bar

RAILROAD STRUCTURES.

ALBANY, GA.—The Albany & Northern, it is said, has arranged to pierce a tunnel 400 ft. long under Broad street at the western end of the river bridge.

BINGHAMTON, N. Y.—The Delaware & Hudson, according to reports, has bought a large tract of land at this place in the east section of the city as a site for large freight transfer sheds. The company, it is said, is planning also to build additional repair shops.

BUFFALO, N. Y.—The Grade Crossings Commission by a unanimous vote recently adopted the general plan which has been generally agreed to by the railroads interested, for the abolition of remaining grade crossings in this city. The plan was drawn up by Engineer Edward B. Guthrie, and provide for the abolition of grade crossings on the main line of the New York Central, the Belt Line, the Erie, Lehigh Valley, Lackawanna, Pennsylvania and Grand Trunk Railroads. The plan, as far as it is acceptable to the Commission and to the Central, provides for a viaduct at Bailey avenue from Stone to Stanley street; subways under Broadway on the main line, 80 ft. wide between abutments, extending from Ideal street to King street, the tracks being raised 12 ft. and the street to be sunk 3 ft., the pavement being widened 7 ft. between Curtis and Young street; Sycamore street, Belt Line, subway; Walden avenue, Belt Line, subway; Genesee street, Belt Line, subway, the tracks to be raised 11 ft. At Fougeron street, Urban street, French street, Box avenue, Ferry street, Northland avenue, Fillmore avenue and East Delavan avenue there are to be subways under the streets and the tracks to be raised. The plan for Kensington avenue calls for a viaduct; for Dewey avenue, viaduct; Le Roy avenue, viaduct; Jewett avenue, viaduct, the tracks being depressed 28 ft.; Amherst street, viaduct, with a clearance of 35 ft. and approaches from Starin avenue, Greenfield street and Central Park station. For Colvin street a subway is provided, also for Delaware avenue below the Belt Line and Erie. Subways are also provided for Elmwood avenue and the Military Road. Hertel avenue is to have a subway, also Amherst street at the New York Central cut-off. Elk street is to be carried over the tracks by a viaduct, the tracks to be lowered 11 1/2 ft. Stairways will be provided on the north side of the viaduct from East and West Market street. Bailey avenue will be carried over the West Shore by a viaduct, the grade of the street to be 18 ft. above the rails, a street 50 ft. wide being opened up to Fay street. Amherst street will be carried under the Central, Erie and D. L. & W. by a subway. Parts of Tonawanda and Thompson streets are to be closed. Austin street will have a subway under the Central and Grand Trunk. Part of Pacific street will be closed. Subways are provided for Walden avenue and Ferry street, under the Erie, also at East Delavan avenue, all under the Erie and D. L. & W. Kensington avenue will have

a subway under the Erie and Lackawanna roads. East Amherst street crosses the Erie and Lackawanna by a viaduct. Walden avenue, Main street, Colvin street and Delaware avenue go under the Erie and Lackawanna by subways. The Black Rock crossing of the Erie will be a subway. Walden avenue, Genesee street and Bailey avenue will have subways under the D. L. & W. The deferred plans for the Niagara street crossing at the Grand Trunk were taken up. The plans call for a subway. The Bailey avenue crossing at the Lehigh, Pennsylvania and D. L. & W. Railroads call for a subway. Walter P. Cooke appeared as attorney for the Lehigh to protest against the plan and ask that it be deferred. The plans for Bailey avenue at the Erie call for a viaduct. Parkside avenue will have a subway under the New York Central Belt Line. The only objections to the plans were that the Erie wants a subway at Bailey avenue, and the Grand Trunk wants its tracks at Niagara street to remain at the present level.

FLUSHING, L. I.—The new Scherzer rolling lift bridge, 169 ft. long and 52 ft. wide, carrying two tracks for street cars with two driveways and 8-ft. sidewalks over the Flushing creek, recently completed, at a cost of \$400,000, has been opened for traffic.

HENDERSON, TENN.—The city officials have given contracts to John D. Keith and to E. A. Moffitt, of Jackson, for building a bridge over the Mobile & Ohio tracks.

MEMPHIS, TENN.—According to local reports the new union passenger station to be built here will be located at Broadway, La Rose, Dadie and Long avenues. Plans for the work will be completed shortly.

MEXICO CITY, MEX.—The recent floods in the Manzanillo district swept away 15 bridges, including three steel structures, on the new line of the Mexican Central. A large portion of the new roadbed and track was also washed away.

OMAHA, NEB.—The Union Pacific, it is said, has arranged to buy land at the northeast corner of Fifteenth and Dodge streets as a site for its general headquarters building.

RALEIGH, N. C.—The Seaboard Air Line, it is said, will put up a large warehouse, to cost about \$40,000, at this place.

ST. LOUIS, MO.—At the meeting of the Terminal Railroad Association to be held in November, the question of making terminal improvements at a cost of about \$6,000,000 will be considered. This represents the cost of improvements proposed in the report given in the *Railroad Gazette* of September 21, page 249.

SAN ANGELO, TEX.—The Atchison, Topeka & Santa Fe is making surveys for a new roundhouse to be built here.

SHARON, PA.—A steel bridge is proposed to be built over the Shenango river, about 200 ft. long, to cost \$25,000.

TEXARKANA, TEX.—The Kansas City Southern, it is said, will put up a new station also general office buildings to replace the structures destroyed by fire.

VICKSBURG, MISS.—Arrangements, it is said, have been made by the Yazoo & Mississippi Valley to put up a new station.

WILKESBARRE, PA.—The Lehigh Valley, it is reported, will contribute \$20,000 towards the erection of a bridge to be built between East End and North Wilkesbarre.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

ALASKA CENTRAL.—Work on this road is being pushed as fast as possible. A force of 700 men is now at work. Grading is expected to be completed and track laid to milepost 70 from Seward this year. There are seven tunnels between mileposts 49 and 54. Grading from milepost 7 to milepost 105 is mostly completed, and the line definitely located to milepost 185. At this point the Matanooska coal fields are located. The road, it is thought, will be in operation as far as these fields by the close of next year. The most difficult work, crossing the coast range of mountains, has been completed, and the balance of the work is easy.

AMERICAN ELECTRIC.—This company has completed its organization in Iowa, with office in Des Moines, and capital stock of \$20,000. The company proposes to build an electric line across the state of Iowa, midway between the Chicago, Rock Island & Pacific and the Chicago, Burlington & Quincy. The line is from Davenport west via Muscatine, Winterset and Greenfield to Council Bluffs, about 270 miles air line. The officers are: C. W. Baker, President; J. D. Pollard, Vice-President and Treasurer, and Charles F. Castleman, Secretary, all of Des Moines.

ARKANSAS PACIFIC.—Incorporation has been asked for in Oklahoma under this name by George D. Locke, of Jerseyville, Ill.; T. D. Kinman and T. D. Kinman, Jr., of Newport, Ark.; Morris Locke,

Abilene, Tex.; Wm. J. Gates, St. Louis; John H. Blackburn, James Gates, David R. Locke, Thomas M. Robinson, Mangum, Okla., for a company with \$40,000,000 capital and office in Mangum. The company proposes to build a line from Mangum, Okla., on the Chicago, Rock Island & Pacific, east through Greer, Kiowa and Comanche counties in Oklahoma, and through the Chickasaw and Choctaw Nations in Indian Territory to Fort Smith, Ark., thence through the counties of Sebastian, Franklin, Logan, Yell, Pope, Conway, Faulkner, White, Woodruff, Cross and Crittenden to Memphis, with branch lines to Abilene, Tex., via Denison, and to Tulsa, Ind. T., to Clarksville, Ark., to Pine Bluff and Newport, a total length of 1,500 miles.

BOSTON & MAINE.—This company has decided to double-track its road from Johnsonville, N. Y., southwest to Troy, 16 miles, and to put in automatic block signals. The double-tracking will begin early next spring.

CHARLESTON & SUMMERSVILLE (ELECTRIC).—This single-phase line, which is to run from Charleston, S. C., northwest to Summersville, 27 miles, is to be built by D. E. Baxter & Co., of New York, who have the contract. (See Construction Record.)

CHICAGO & NORTH-WESTERN.—The Wyoming & North Western was opened for traffic Oct. 15th from Arapahoe to Lander, Wyo., 16 miles, completing the line from Casper to Lander, 148.1 miles.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—An officer writes that this company has incorporated in Indiana the Evansville, Mt. Carmel & Northern to build a line, for which contracts will be let within 30 days, from Evansville, Ind., north to a connection with the C. C. & St. L. at Mt. Carmel, Ill., about 35 miles. Maximum grades are to be three-tenths of one per cent. southbound and five-tenths of one per cent. northbound. There is to be a steel bridge 1,200 ft. long over the Washington river. W. C. Brown, Senior Vice-President of the New York Central & Hudson River, is President, and W. M. Duane is Chief Engineer, Cincinnati, Ohio. (Oct. 5, p. 90.)

COAL & COKE.—This West Virginia road, which was built largely through the efforts of its President, Senator Henry G. Davis, by its connections with existing lines forms an important through line. Although the road was put in operation some time ago it was not

mile road, and at Dundon, near Clay, with the Buffalo Creek & Gauley, eight miles long. The company is planning to build extensions from Gassaway, which is about half way between its termini east up the Elk river to a short distance beyond Sutton, where connection is to be made with a branch of the B. & O.; also a line from Gilmer, east of Gassaway, up the Little Kanawha, 11 miles, to Glenville, the county seat of Gilmer County, at present without rail connection. Near the eastern end of the road a line is to be built by other interests about 30 miles long to develop timber lands. A number of other independent short lines are projected to connect with the Coal & Coke. At Gassaway, where the road crosses the Elk river, the company has built shops, employing about 300 men.

COLORADO & SOUTHERN.—The Trinity & Brazos Valley division is practically completed, and as soon as the surfacing is completed through trains will be run between Denver, Colo., and Galveston by way of Fort Worth, from which point trackage rights have been obtained over the Gulf, Colorado & Santa Fe south to the Trinity & Brazos Valley at Cleburne, 28 miles. Trackage rights have also been secured from the same company from Houston to Galveston, 53 miles.

COLUMBUS, MAGNETIC SPRINGS & DELAWARE INTERURBAN.—Incorporated in Ohio, with \$400,000 capital, to build electric railroads. The officers are: W. M. Galbraith, Pittsburg, Pa., is President; Chris McGee, Jr., Pittsburg, Pa., is Vice-President and Treasurer; W. N. Embert, Secretary. J. H. Leonard and J. L. Horn are Directors.

DENVER, NORTHWESTERN & PACIFIC.—D. H. Moffat, President of this company, is reported as saying that the road will be built to Salt Lake City by Jan. 1, 1908. By April 1 next it will be completed to Steamboat Springs, and from that point westward the work of construction will not be difficult. The distance from Steamboat Springs to Salt Lake is about 300 miles. (See Construction Record.)

ELKHORN SOUTHERN.—Incorporated in Virginia with \$25,000 capital and office at Bristol. It is proposed to build a line from the Virginia-Kentucky state line near the Big Sandy river in Dickenson or Buchanan counties, Va., 40 miles long, with branches through Dickenson, Buchanan and Russell counties. Geo. L. Carter is President, and J. C. Stone, Secretary and Treasurer, of Bristol, Va.

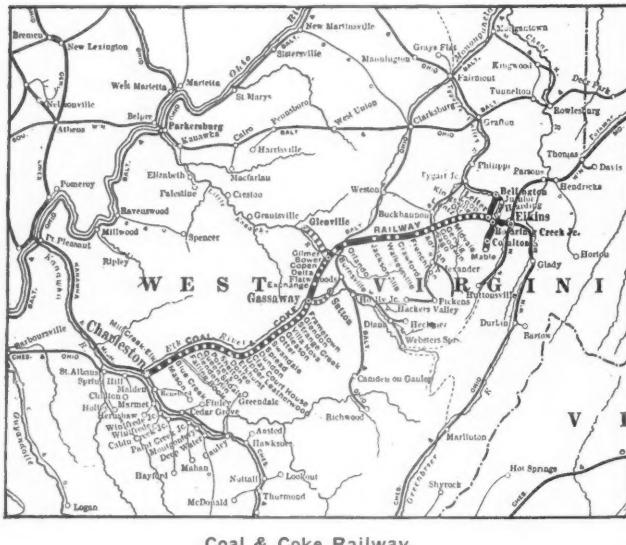
EVANSVILLE, MT. CARMEL & NORTHERN.—See Cleveland, Cincinnati, Chicago & St. Louis.

HORNELL BATH & LAKE KEUKA (ELECTRIC) COMPANY.—Incorporated in New York, with a capital of \$1,000,000, to operate an electric line from the Pittsburg, Shawmut & Northern in Hornellsville northeast to Jerusalem, Yates County, 46 miles. The directors are: John F. Turk and Charles G. Wheeler, of Hammondsport; Fred W. Hastings, Wilson R. Campbell, Moses Davison, Dr. W. H. Phillips, G. H. Parkhurst and Frank N. DeCamp, of Bath, and L. D. Whiting, of Canisteo.

IDAHO NORTHERN.—This company proposes to build from Kingston to Murray, Idaho, and to the Coeur d'Alene lead district near Murray. Plans are also being made to connect Murray with Wallace, continuing thence westward to Spokane. B. F. O'Neill, President of the State Bank of Commerce, Wallace, is President, and has associated with him J. W. Douglas, of New York City. The Big Bend Water Power Company is building a plant 28 miles down the Spokane river, where 20,000 h.p. will be developed, and branch lines to be operated by electricity will probably be built to connect with the Idaho Northern.

INDIAN CENTRAL.—Incorporated in Oklahoma with \$15,000,000 capital and office at Oklahoma City. The promoters intend to build a line from Ponca, Okla., on the Atchison, Topeka & Santa Fe, east through Kay County, the Osage country and the Cherokee Nation to an intersection with the St. Louis, Iron Mountain & Southern; thence south through the Cherokee, Creek and Choctaw Nations, crossing the Red river into Lamar County, Texas; thence southeast to Paris, Tex., on the Gulf, Colorado & Santa Fe, St. Louis & San Francisco, Texas Midland and the Texas & Pacific. A branch line is also projected from a point where the main line crosses the Red river, northwest through the Choctaw and Chickasaw Nations and the counties of Pottawatomie, Cleveland and Oklahoma to Oklahoma City, a total of 460 miles, 120 miles of which will be in Oklahoma. The incorporators include Pleasant Porter, of Muskogee; E. T. Hathaway, O. D. Halsell, Ed. Overhoiser and William C. Reeves, of Oklahoma City.

IOWA & NORTH WESTERN.—This company has been incorporated in Iowa, with a capital of \$100,000, to build 75 miles of railroad east from Waterloo. Stephen B. Howard is President; E. M. Rice, Vice-President, and E. C. Luther, Secretary and Treasurer, all of New York. The office of the company is to be at Waterloo. Sur-



Coal & Coke Railway.

formally opened until last week. Traffic arrangements have been made with the Kanawha & Michigan and with the Chesapeake & Ohio at its western terminal at Charleston, W. Va. As its name suggests, the road was built to develop coal properties. The company owns 100,000 acres of coal lands in Randolph, Barbour, Upshur, Lewis, Gilmer and Braxton Counties. There are some 800,000 acres of coal lands along its line. The road crosses and partly parallels the Middle Fork, Buckhannon, Little Kanawha and Elk rivers, from which source large traffic in both coal and timber may be developed. It runs northeast for 175.2 miles to Elkins, where connection is made with the Western Maryland for the east. It also has a northern division from Elkins to Belington, 17.7 miles, where connection is made with the Baltimore & Ohio. Branches of the B. & O. are also crossed at Sago and at Orlando, and track connection with this company is made at Burnsille. Near its western end the road crosses the Kanawha & West Virginia at Blue Creek. This road, which operates 20 miles, is soon to be extended for 20 miles more. Connection is also made with the Meadville & Summersville, a five

veys will be made at once. There will be a bridge over the Cedar river to cost about \$10,000.

JACKSON, PASCAGOULA & GULF.—Incorporation has been asked for by a company under this name in Mississippi to build a line from Jackson, on the Gulf & Ship Island, the Illinois Central and the Yazoo & Mississippi Valley, southeast to the deep water harbor at Pascagoula, 160 miles air line. The proposed route is through Smith county and thence by the most direct route to Pascagoula. Negotiations are under way with an eastern syndicate to finance the project. The incorporators include F. A. Lewis, of Scranton; Stone Deavours, of Laurel, and E. C. Jones, of Jackson.

KENTUCKY NORTH & SOUTH.—Incorporated in Kentucky with \$250,000 capital and office at Covington. The incorporators, which include J. T. Fitzpatrick and L. E. Miles, of Springfield, Ohio; A. T. Noe, Pittsburgh, Pa.; J. P. Purdon, Portsmouth, Ohio, and C. H. Hoglen, Dayton, Ohio, propose to build a line from Fullerton, Greenup County, Ky., on the Chesapeake & Ohio, south to Bristol, Sullivan County, Tenn., through the counties of Greenup, Carter, Elliott, Lawrence, Morgan, Johnson, Magoffin, Floyd, Knott and Letcher in Kentucky; Wise, Scott, Russell and Washington in Virginia, and Sullivan in Tennessee, approximately 200 miles.

LAKE SUPERIOR SOUTHERN.—Surveys have been completed by this company and contracts are reported let to the Eldenbell Construction Company for building this proposed line from Huron Bay, on Lake Superior, south to Madison, Wis., 290 miles. About 75 miles is to be in Michigan and 215 miles in Wisconsin. (See Construction Record.)

LAUREL RAILWAYS.—Incorporated in Virginia with \$25,000 capital to build a line from Damascus, Washington County, south to the Virginia-Tennessee state line, about five miles. E. A. Mock is President; F. G. Clements, Vice-President, and J. I. Hurt, Secretary, all of Damascus.

MARIANNA, BRINKLEY & WESTERN.—An officer writes that contracts are to be let about the first of next year to build a line from Marianna, Ark., northwest to Brinkley, 28 miles. Maximum grades will be three-tenths of 1 per cent. and the maximum of curvature 2 degrees. (Oct. 19, p. 107.)

MEXICAN INTERNATIONAL.—Traffic on this road has become so heavy that it has been decided to double-track a portion of the line. The first portion to be double-tracked will be between Sabinas and Reata. The present single-track is insufficient to handle the coal and coke traffic out of Sabinas. When this section is finished work will be started on the division between Reata and Monterey.

NEW YORK CENTRAL LINES.—See Cleveland, Cincinnati, Chicago & St. Louis.

NEW YORK CITY SUBWAYS.—The Appellate Division of the New York Supreme Court has confirmed the favorable reports of the Commissioners appointed to report upon six different rapid transit routes. The routes are known as the Fourteenth street, Thirty-fourth street, Third avenue, Lexington avenue, Seventh and Eighth avenues and Gerard avenue routes.

NORTHERN ELECTRIC.—This company, which operates a line from Chico, Cal., to Oroville, is making good progress between the latter point and Marysville. The entire 28 miles is graded and 12 miles of track is down. The extension from Marysville to Sacramento will be finished by April. The northern end of the Sacramento valley is to be covered by the Redding & Red Bluff, which will be operated partly by steam and partly by electric power.

NORTH SHORE & WESTERN (ELECTRIC).—Incorporated in Illinois with \$50,000 capital to build a line from Elgin, Ill., west to Evanston, about 35 miles. Surveys have been made to within a few miles of Elgin and terminal arrangements have been completed in both cities. Geo. P. Merrick, 100 Washington street, Chicago, is attorney for the company. The incorporators and directors include: William C. McHenry, E. R. Fifer, George P. Merrick and William A. Love, of Chicago.

OKLAHOMA, TEXAS & WESTERN.—Incorporated in Oklahoma, with office at Cheyenne. The company proposes to build a line from Thomas southwest via Clinton to Elk City, thence northwest to Cheyenne, about 80 miles. The directors include L. L. Collins, A. C. Miller, L. W. Pate and R. V. Converse, of Cheyenne, and D. D. Fitzgerald, of New York.

POWELL'S RIVER.—Announcement is made that this company will build a branch from Blackwood, Va., to coal fields at the head of Powell's river, 10 miles. Surveys are being made. Charles Christy, Blackwood, Va., is Chief Engineer.

ROSWELL & EASTERN.—It is reported that this company, recently chartered in New Mexico, is a Gould project and that it will build the New Mexico link in the line which is to connect the Texas & Pacific system in Texas with the Denver & Rio Grande. The Roswell & Eastern is to be built from Torrence, N. Mex., south to a

point on the boundary between Texas and New Mexico, about 200 miles. It will connect with the Santa Fe Central at Torrence and with the proposed extension of the Weatherford, Mineral Wells & Northwestern at the Texas-New Mexico border. The Weatherford & Mineral Wells road, connecting with the Texas & Pacific at Weatherford, is a Gould property. The incorporators of the Roswell & Eastern are: K. S. Woodruff, C. W. DeFrees, R. F. Barnett, George T. Veal and W. Wells, all of Roswell.

SAVANNAH, STATESBORO & WESTERN.—Under this name a company has been incorporated in Georgia with a capital of \$1,000,000 to build a line from Statesboro, on the Central of Georgia and the Savannah & Statesboro, northwest to Atlanta, about 210 miles, through Bullock, Emanuel, Johnson, Washington, Baldwin, Jones, Jasper, Newton, Rockdale, DeKalb and Fulton counties. The incorporators include J. R. Anderson, T. F. Walsh, Jr., and W. E. O'Connor, of Savannah. This is thought to be a Seaboard Air Line project.

SHELBY COUNTY.—An officer writes that contracts will either be let in about 15 days for building this line or the work will be done by the company's men. The proposed route is from Shelbyville, Mo., south to Shelbyville, eight miles. The work will not be difficult as the line is to be practically without curves, excepting near terminals. There are to be two bridges, one of about 120 ft. and the other 80 ft. (Oct. 5, p. 92.)

SIOUX FALLS & SIOUX CITY (ELECTRIC).—Articles of incorporation have been filed in Pierre, S. Dak., by a company under this name which proposes to built 60 miles of electric railroad paralleling the St. Paul road. Capital \$1,000,000. The names of the incorporators are not given.

TOLEDO, PORT CLINTON & LAKE SIDE.—This company, operating 53 miles of electric road in Ohio from Toledo east to Marblehead, and which has been running cars from the Toledo city limits to Genoa, 10 miles, over the tracks of the Lake Shore Electric, has completed an independent entrance to Toledo over a private right of way from the present junction north to Curtice, thence to Booth and to the center of the city of Toledo. The new section, on which construction was begun about a year ago, is almost ready for operation. The work included an overhead crossing at Clay Center over the main line of the Lake Shore & Michigan Southern.

TRINITY & BRAZOS VALLEY.—See Colorado & Southern.

WESTERN MISSOURI INTERURBAN.—Incorporated in South Dakota with \$3,000,000 capital and with offices at Clinton, Mo., and at Sioux Falls, S. Dak. The company proposes to build a line, to be operated either by electricity or other motive power, from Odessa, in Lafayette County, Mo., on the Chicago & Alton south through Lafayette, Johnson, Henry, St. Clair and Cedar counties to Greenfield, in Dade County, on the St. Louis & San Francisco, approximately 125 miles. The incorporators include D. J. Haugeberg, F. S. Gray, E. W. Campbell and S. S. Halliday, of Clinton, Mo., and others of South Dakota.

RAILROAD CORPORATION NEWS.

BALTIMORE & OHIO.—See Washington Terminal.

CANADIAN NORTHERN.—See Canadian Northern Quebec.

CANADIAN NORTHERN QUEBEC.—Sperling & Co. have offered in London at 98 per cent. £1,000,000 (\$4,850,000) 4 per cent. perpetual debenture stock guaranteed by the Canadian Northern. The stock was issued in exchange for securities of the Great Northern of Canada, the Chateauguay Northern and the Quebec, New Brunswick & Nova Scotia, which roads have been consolidated under the name Canadian Northern Quebec. (Oct. 5, p. 92.)

CHICAGO, CINCINNATI & LOUISVILLE.—It is announced that this company has made an agreement with the Illinois Central by which the C. C. & L. gets an entrance into Chicago by running over the Illinois Central tracks from Hammond, Ind. This gives the C. C. & L. a through line from Cincinnati to Chicago.

CINCINNATI, HAMILTON & DAYTON.—The *Commercial and Financial Chronicle* gives the following official list of receiver's certificates issued by the Receiver of the Cincinnati, Hamilton & Dayton and the Pere Marquette:

Cincinnati, Hamilton & Dayton.

Jan. 1, 1906.—5½ per cent., payable one year after date and issued to pay interest due on bonds.....	\$511,830
July 2, 1906.—6 per cent., payable one year after date and issued to pay interest due on bonds	511,830

Pere Marquette.

Jan. 1, 1906.—5½ per cent., payable one year after date....	\$419,180
May 5, 1906.—5½ per cent., payable in semi-annual instalments of \$200,000 each, beginning Feb. 1, 1907, and issued to pay back taxes for the years 1902-1905, inclusive.....	1,200,000
July 2, 1906.—6 per cent., payable one year after date, and issued to pay interest on bonds.....	419,180

CONSOLIDATED (N. Y., N. H. & H. ELECTRIC LINES).—The New York, New Haven & Hartford has offered to exchange, up to June 30,

1907, one share of its capital stock for each \$200 face value in 50 year, 4 per cent. debentures of the Consolidated, of the issues of July, 1904, January, 1905, and January, 1906. Of the 1904 issue, \$5,000,000 are outstanding, all being in the hands of the public. The N. Y., N. H. & H. holds \$1,393,000 of the outstanding \$3,995,000 issued in 1905 and \$8,566,000 of the outstanding \$10,000,000 issued in 1906. In April, 1905, \$3,500,000 were issued; this amount is all held by the N. Y., N. H. & H.

GREEN BAY & ST. PAUL.—See Green Bay & Western.

GREEN BAY & WESTERN.—A committee representing the \$7,000,000 debenture "B" income bonds was formed about a year ago and a majority of the securities were deposited with it. According to the plan of the reorganization of the road in 1896 the debenture "B's" are entitled to the surplus earnings at the end of each year after 5 per cent. each has been paid on the \$600,000 debenture "A's" and the \$2,500,000 capital stock. These dividends were paid in 1905 and 1906, but so far no distribution of surplus has ever been made to the holders of the debenture "B's." The surplus after dividends on December 31, 1905, amounted to something less than 1 per cent. on the last named securities. A plan has now been made by the above mentioned committee for buying control of, or all of, the capital stock. It has been given an option on a majority of this stock and has issued a circular calling upon the debenture "B" holders to subscribe \$400 for every \$1,000 held to provide funds for this purchase. It is intended to reorganize the road under the name Green Bay & St. Paul, and extend it to St. Paul, 120 miles, giving it, in all, 330 miles of line from Green Bay, Wis. If the stock is bought, the 5 per cent. dividends on it will, pending the reorganization, be distributed among the holders of the committee certificates which have been issued in exchange for the debenture "B's" deposited. The time during which deposits of the securities could be made was to have expired on October 25th. After the reorganization, first mortgage 4½ per cent. bonds of the new company, limited to \$25,000 per mile of line, are to be given to subscribers at 90 per cent. of their face value, in exchange for the subscriptions mentioned above, and not less than \$600,000 of these bonds are to be set aside to take up the \$600,000 "A" debentures. The subscribers are also to receive, in exchange for their debenture "B" bonds, one-half of the par value of the bonds in 4 per cent. non-cumulative preferred stock and one-half in common stock of the new company. The committee consists of J. H. Davis, Rudolf Kleybolte, G. M. Pynchon, J. M. Levy, W. E. D. Stokes and Martin Van Buren. L. M. Ogden, New York, is Secretary.

ILLINOIS CENTRAL.—Stuyvesant Fish, President of this company, has resigned as Vice-President and Director of the Railroad Securities Company, a holding company for 94,730 shares of the 950,400 outstanding shares of Illinois Central stock. One-third of these shares were owned by Mr. Fish; the rest by E. H. Harriman and Kuhn, Loeb & Co. Mr. Fish is said to have transferred his holdings, which could be voted against him according to the agreement under which they were deposited in the Railroad Securities Company, to Mr. Harriman for half the amount in cash and half in stock.

See Chicago, Cincinnati & Louisville.

KANSAS CITY SOUTHERN.—Gross earnings for the three months ended September 30, 1906, were \$2,064,951, an increase of \$417,471; net earnings, \$721,757, an increase of \$389,362.

LOUISIANA & ARKANSAS.—The gross earnings of this company for the year ended June 30, 1906, were \$1,057,526, an increase of \$212,990; net earnings \$371,334, an increase of \$48,520. The surplus after charges was \$238,659, an increase of \$37,137. The road runs from Hope, Ark., to Jena, 187 miles, and has a branch from Packton to Alexandria, 36 miles.

NEW YORK, NEW HAVEN & HARTFORD.—See Consolidated.

NORFOLK & SOUTHERN.—The stockholders of the Norfolk & Southern Railroad Company and of the Virginia & Carolina Coast have confirmed the consolidation of the two companies under the name Norfolk & Southern Railway Co. The Pamlico Oriental & Western, which is under construction from New Bern, N. C., to Goose Creek, 38 miles, and was some time ago acquired by the Virginia & Carolina Coast, has been sold to the Atlantic & North Carolina. The Norfolk & Southern Railway owns and operates 300 miles of road from Columbia, N. C., to Suffolk, Va. It leases the Atlantic & North Carolina, which runs from Goldsboro, N. C., to Morehead City, 95 miles. The new company also owns all the capital stock of the John L. Roper Lumber Company, which owns over 600,000 acres of timber land, and has timber rights on about 200,000 acres more. The capital stock of the new railroad company is \$20,000,000 common and \$5,000,000 five per cent. non-cumulative preferred. There have been authorized \$25,000,000 first mortgage and refunding five per cent. 50-year

bonds, of which \$3,500,000 are reserved to retire all outstanding liens and \$14,000,000 have been issued to provide in part for acquisition of other property and to provide for extensions. The remainder of the funds used in the acquisition of property and for other expenses of consolidation were provided by the issue of \$4,800,000 preferred stock and \$12,700,000 common stock.

NORFOLK & WESTERN.—A semi-annual dividend of 2½ per cent. has been declared on the \$64,469,200 outstanding common stock payable December 21 to stockholders of record November 5. Previous dividends have been as follows: 2 per cent. in 1901, 2½ per cent. in 1902, 3 per cent. in 1903, 3 per cent. in 1904, 3½ per cent. in 1905 and 2 per cent. in June, 1906.

PENNSYLVANIA.—See Washington Terminal.

PERE MARQUETTE.—The gross earnings for the year ended June 30, 1906, were \$13,430,169, an increase of \$762,749. The taxes were nearly \$1,200,000, an increase of \$745,000, because of the back payments made necessary by the decision of the United States Supreme Court, last April, sustaining the law passed by the Michigan legislature in 1901 providing for a tax on gross earnings. The net earnings of the Pere Marquette after deducting taxes were \$2,300,158, a decrease of \$36,822; the deficit after charges was \$860,947, which compares with a deficit of \$22,431 in 1905.

See Cincinnati, Hamilton & Dayton.

RAILROAD SECURITIES COMPANY.—See Illinois Central.

SANTA FE, RATON & DES MOINES.—See Santa Fe, Raton & Eastern.

SANTA FE, RATON & EASTERN.—A semi-annual dividend of 2½ per cent. on the \$300,000 capital stock was paid on October 18th. The road runs from Raton, N. Mex., to Yankee, 12 miles, and this dividend is the first paid since the lease of the road to the Santa Fe, Raton & Des Moines, which guarantees 5 per cent. on the stock and the principal and interest of the \$300,000 5 per cent. first mortgage bonds of 1935. The Santa Fe, Raton & Des Moines is under construction from Carrisbrook, on the S. F., R. & E., to Des Moines on the Colorado & Southern, 41 miles, and has outstanding \$1,000,000 5 per cent. first mortgage bonds of 1936.

SOUTHERN PACIFIC—Gross earnings for the month of August were \$9,711,055, an increase of \$1,119,114. Net earnings after taxes \$3,571,457, an increase of \$701,172. The gross earnings for the two months ended August 31, 1906, were \$18,957,476, an increase of \$2,176,358; net earnings after taxes \$5,941,126, an increase of \$1,478,546.

VELASCO, BRAZOS & NORTHERN.—The sale of this road to H. C. Alexander, Dallas, Tex., for \$80,000 has been affirmed by the court. The road was sold under foreclosure to Mr. Alexander early in July, but the purchaser failed to complete his bid and the sale was set aside. The road runs from Houston, Tex., to Velasco, 20 miles, and was sold to satisfy an indebtedness of \$236,000.

VIRGINIA & CAROLINA COAST.—See Norfolk & Southern.

WABASH.—At a special meeting of the stockholders and debenture bondholders on October 22, the following plan for the retirement of the debentures was approved: An issue of \$200,000,000 seven per cent. non-cumulative preferred stock is to be made and the proceeds used to refund the outstanding bonds and for betterments, extensions and equipment. The \$24,000,000 seven per cent. non-cumulative preferred stock is to be increased by \$16,500,000 and the \$38,000,000 outstanding common stock (\$78,000,000 authorized) is to be increased by \$81,500,000. The issue of \$16,500,000 of each class of stock is authorized to be exchanged for debenture bonds. The \$3,500,000 debenture "A" six per cent. bonds are to be exchanged for new securities as follows: For each \$1,000 in bonds \$775 in new bonds and \$560 par value of preferred stock and \$560 in common stock. Each \$1,000 in bonds of the \$26,500,000 six per cent. non-cumulative debenture "B's" is to be exchanged for \$700 par value new bonds, \$500 par value preferred stock and \$500 common stock. Full interest was paid on the debenture "A" bonds from 1900 to July, 1904, inclusive, but no interest has been paid since then. No interest has ever been paid on the debenture "B" bonds.

WASHINGTON TERMINAL.—According to the annual report of the Baltimore & Ohio, \$9,364,949 had been spent up to June 30, 1906, by the Washington Terminal Company, which is building a union passenger station at Washington, D. C., for the Baltimore & Ohio and the Philadelphia, Baltimore & Washington, the last named road being a subsidiary of the Pennsylvania. All the foundation work for the station building has been finished and about 60 per cent. of the steel work and of the granite masonry has been erected. Work is under way on the power house foundation; the filling and bridge work on the approaches are nearly done. It is expected that the terminal will be in operation some time during the present fiscal year.

